Measurement of Toxic Air Pollutants for Neighborhood Assessment

FINAL REPORT FOR BARRIO LOGAN MEASUREMENT STUDY

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1. Introduction

1.1 Study Objectives

Under existing funding, UC Riverside is conducting tracer and toxics monitoring studies in Neighborhood Assessment Program (NAP) communities to evaluate models used to predict concentrations of toxic emissions due to direct transport of pollutants from facilities. The primary objective of this study was to evaluate emissions inventory and dispersion modeling that has been developed for the Barrio Logan community. Secondary objectives included identifying pollutant concentrations at receptors in the community and conducting limited source apportionment. This study was performed concurrently with a tracer study conducted by UC Riverside in Barrio Logan in December 2001, and overlapped with an intensive air monitoring study conducted by ARB's Monitoring and Laboratory Division at residences in the immediate vicinity of two chrome platers. Results from the tracer study will be summarized in a separate report to be released in early 2004. Monitoring results at the residences are available at: http://www.arb.gov/ch/communities/studies/barriologan/barriologan.htm.

1.2 Approach

- *Overview*

To meet our primary objective, we measured concentrations of more than 50 pollutants at four sites in Barrio Logan, and one background site for 12 days in the winter 2001-2002. During this study we also released tracer gas from the National Steel and Shipbuilding Company (NASSCO) and measured its concentration at the five sites to help verify our emissions inventory at these locations.

A portion of this study coincided with the more comprehensive study designed to develop a database of tracer concentrations in the community for use in evaluating model results.

- *Selection of Sampling Locations*

Five monitoring locations were selected in accordance with the following criteria:

- Locations where significant impact is expected from the emission source where the tracer is released.
- Locations were sensitive subjects spend considerable time (such as schools).
- Adequate power and security.
- Collocated with SF_6 sampling locations for the tracer program.
- Free of nearby obstructions to airflow.
- Appropriate receptor or background position.
- Site permission.
- Cost.

One of the five sites was located upwind of the prevailing on-shore flow to serve as a background.

- *Sampling Equipment*

Samplers for this program were custom designed and constructed. Samplers were automatically collected for twelve-hour periods (8 a.m. to 8 p.m.) on weekdays. Substrates were changed manually after each day of sampling. Weather forecasts were used to avoid sampling on days with wind speeds exceeding 15 knots, significant rainfall above drizzle conditions, or persistent easterly winds.

At each sampling site the following equipment was installed:

- A pair of collocated bag samplers for collecting single 12-hour samples for tracer analysis
- A VOC canister sampler (the automated instrument developed by the Desert Research Institute). These samplers used SUMMA® polished canister cleaned according to EPA method TO-14.
- A carbonyl sampler (2,4-dinitrophenylhydrazine coated adsorbent cartridges). The automated instrument developed by AttMA was used.
- A customized particulate sampler with TSP, PM_{10} and $PM_{2.5}$ inlets that collect particulate samples on the following substrates:
  - Teflo Filter for $PM_{2.5}$ at 115 L/min (mass).
  - Teflo Filter for TSP at 80 L/min (xrf elements).
  - Quartz Filter PM_{10} at 16.7 L/min (OC/EC).
  - Bicarbonate Impregnated Cellulose Filter for TSP at 20 L/min (Cr^{+6}).
- Anemometer and data logger for wind speed and direction (one site)

1.3 Scope of Work

This project consisted of the following tasks:

- Work Plan to describe the measurement program.
- Locate and obtain permission to use five appropriate measurement sites.
- Provide and install samplers to collect samples for:
  - Tracer Gas
  - VOC.
  - Carbonyls.
  - $PM_{2.5}$ mass.
  - Particulate metals.
  - PM_{10} organic and elemental carbon.
  - Particulate $^{Cr+6}$.

- Install anemometer and data logger at one site.
- Collect daily samples for 12-15 weekdays.
- Analyze 12 sample sets samples.
- QC sample analysis and convert to concentration units.
- QC Meteorological data.
- Report to present data collection methodology, data, and a summary of the quality and quantity of the data collected.

2. Measurement Procedures

2.1 Locations

- Measurement Sites

Figure 2-1 shows the measurement site locations expected to be impacted by the tracer and Figure 2-2 shows the location of the background site. The sites are described as follows:

- **Site #1: Memorial Academy Charter School**. We placed our monitoring equipment at the same location as the previous ARB monitor for the Children's Environmental Health Protection Program (SB25), which measured pollutant concentrations in 1999-2001. Results from previous measurements taken at this site are available at: http://www.arb.ca.gov/ch/communities/studies/barriologan/barriologan_17monthstudy.htm. Measuring at this site allows comparison to these data, even though sample durations were different (12 vs. 24 hours). Figure 2-3 shows photographs of the site.
- **Site #2: The Mercado Apartment Complex**. Our sampling equipment was placed on top of the laundry facility. The Mercado Apartments house a substantial number of residents in Barrio Logan and represent many receptors in the community. The apartments are also potentially affected by emissions from traffic on the Coronado Bridge, and by local emission sources. During this study additional measurements of hexavalent chromium were made by the Monitoring and Laboratory Division of the Air Resources Board for its Special Monitoring Study of two chrome platers located one block southeast of the apartments. Our sampler was located approximately 100 meters to the northwest of sampling equipment operated at the Apartment Complex during the Special Monitoring Study. Figure 2-4 shows photographs of our site. Information about monitoring conducted for the Special Monitoring Study is located at http://www.arb.ca.gov/ch/communities/studies/barriologan/barriologan_chromium.htm.
- **Site #3: 2883 Boston Avenue.** This site is in a residential area located near major emissions sources in the community including Interstate 5. Figure 2-5 shows photographs of the site.
- **Site #4: On the roof of Building 14 at the NASSCO facility**. This building is on the west side of Harbor Boulevard. No photographs were taken of this site due to security rules.

- **Site #5: Point Loma collocated with the San Diego Air Pollution Control District site.** This site represented background pollutant concentrations. Figure 2-6 shows photographs of this site.

- *Tracer Gas Release Point*

During both this study and the concurrent tracer study conducted by UC Riverside, tracer gas was released from the "sandbox", a centrally located work-area at the NASSCO facility. The sandbox is located in close proximity to both welding and diesel emissions sources at the facility. Because the sandbox is located in close proximity to emissions sources, releasing tracer gas and measuring concentrations at each monitoring location allows for evaluation of emissions inventories used to represent the facility.

During this study, we released tracer gas at a 4 kg/hr rate. When this study coincided with the larger CE-CERT tracer study, tracer release rates were increased to 16 kg/hr. The release rate was increased during the tracer study to ensure that concentrations at downwind tracer gas monitoring locations, located up to 2 kilometers from the source for the larger tracer study, were at high enough to be quantified. We are unaware of any local sources of SF6 and expected the concentrations to be near the global background of approximately 4 ppb if not impacted by the release.

Figure 2-1. Location of the four sites expected to be impacted with industrial air pollutant emissions and the release point.

Figure 2-2 Location of background site with respect to the release point.

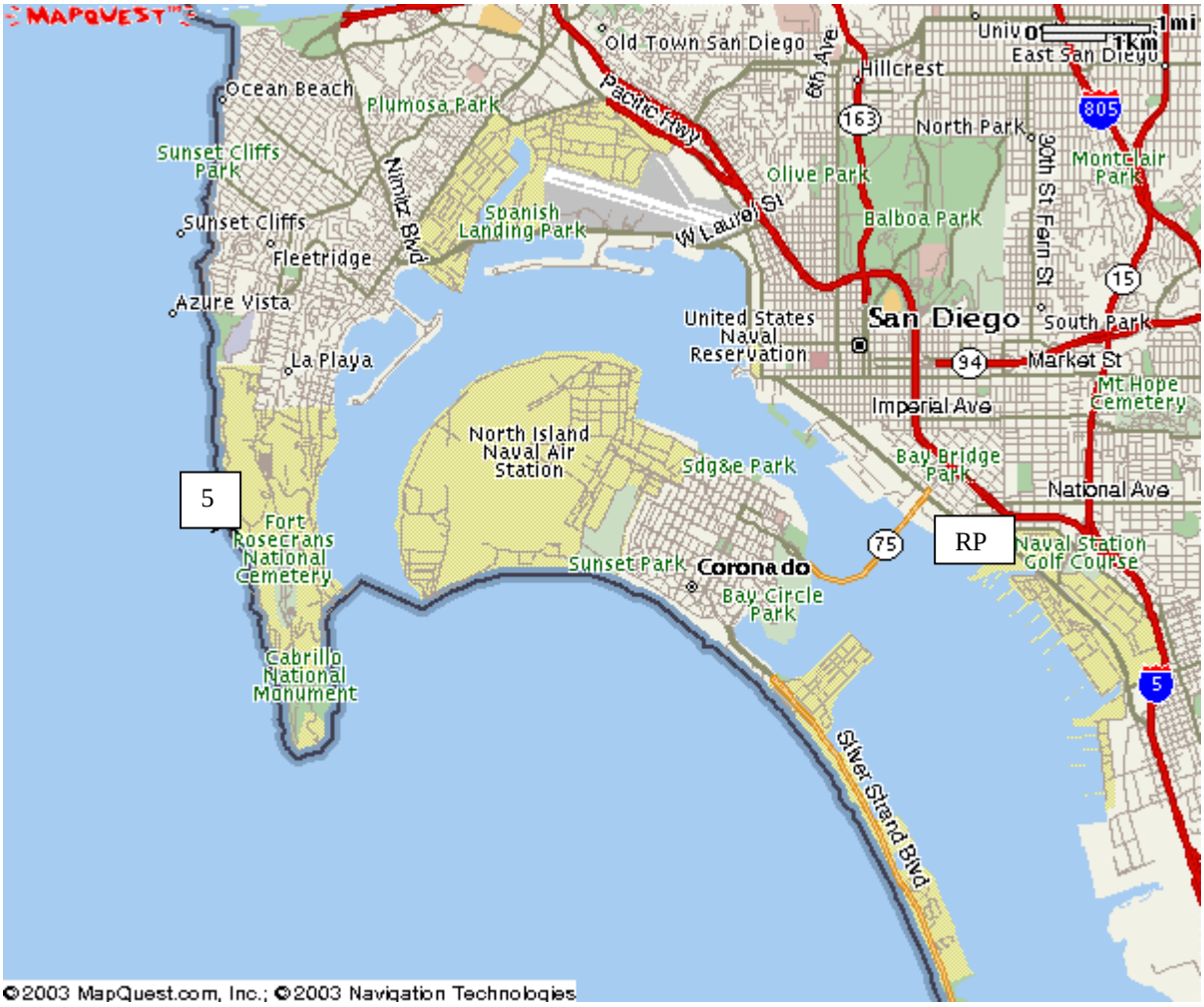


Figure 2-3. Photographs of the site at Logan Memorial School (site #1)

2-3a. Facing east

2-3b. Facing south

Figure 2-4. Photographs of site at Mercado Apartment complex (site #2)

2-4a. Facing north

2-4b. Facing east

2-4c. Facing south

2-4d. Facing west

Figure 2-5. Photographs of site at Boston Apartments (site #3).

2-5a. Facing north

2-5b. Facing east

2-5c. Facing south

Figure 2-5. Photographs of the measurement site at Pt. Loma (site #5)

2-6a. Facing north

2-6b. Facing east

2-6c. Facing south

2-6d. Facing west

2.2 Toxic Air Contaminant Collection and Analysis Methods

2.2.1 Volatile Organic Carbon

Stainless steel SUMMA®-polished canisters of 6 L capacity were used for collecting gaseous sample for volatile hydrocarbon (C_2-C_{12}) analysis. Samples were integrated over the collection period by filling at a constant flow rate using a stainless steel pump with Viton diaphragm. An electronic timer was used to automatically fill the canisters.

The Desert Research Institute (DRI) of the University of Nevada analyzed the canisters for VOC. Hydrocarbons in the air from the sampling canister were concentrated in a freeze-out trap immersed in liquid oxygen. The contents of the trap were then immersed in boiling water and injected into a Hewlett-Packard model 5890 series II gas chromatograph equipped with either a J&W DB-1 fused silica capillary column (for compounds $>C_4$) or a J&W GS-Alumina PLOT fused silica capillary column (for C_2 to C_4 compounds) and a flame ionization detector. Up to 160 compounds can be identified by retention time with a lower quantifiable limit of 0.1 ppbC. An additional analysis was conducted using an Electron Capture Detector (ECD) that has greater sensitivity for halogen-containing VOC.

2.2.2 Carbonyl Compounds

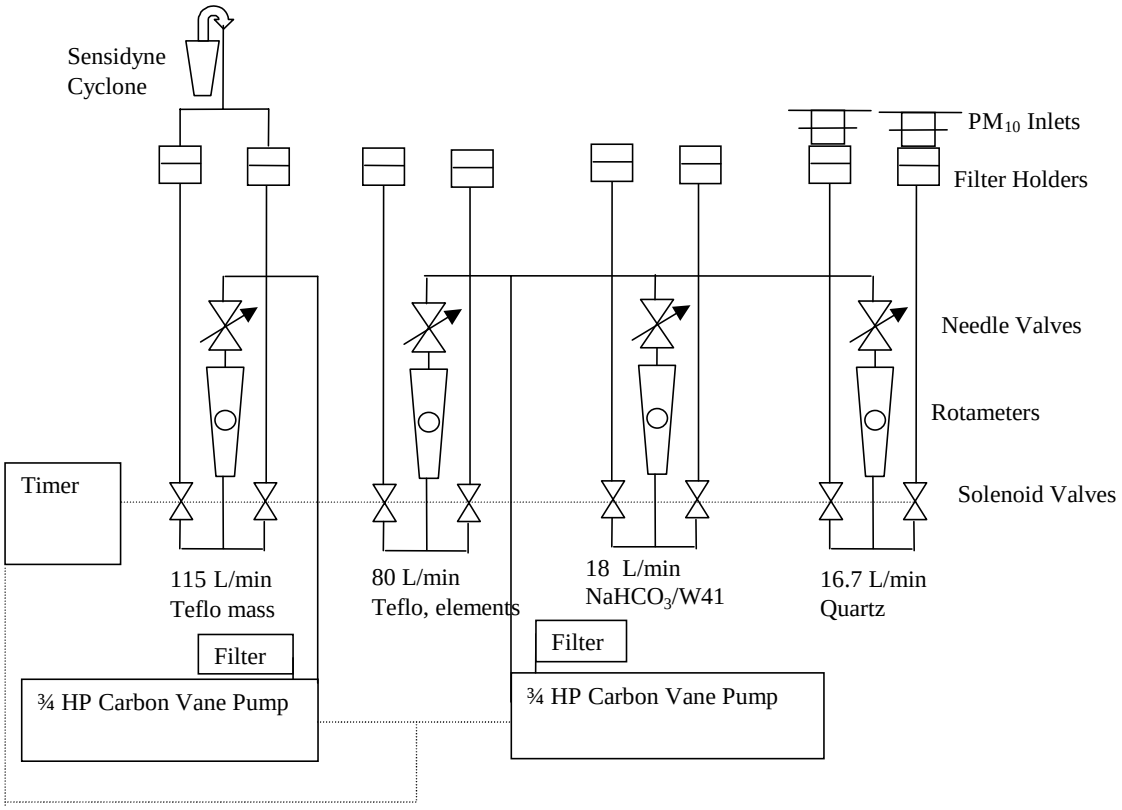
Atmospheric Measurement Associates (AttMA) provided the carbonyl sampler and analyzed the collected substrates. EPA Method TO-11 was used. Carbonyls were collected on silica gel cartridges that were impregnated with acidified 2,4-dinitrophenylhydrazine (DNPH) reagent for ambient sampling. Air samplers were collected through the cartridge at a flow rate of 0.6 L/min Sample was first passed through ¼ inch OD copper tubing coated with potassium iodide to remove ozone. Carbonyls in the air sample were captured by the reaction with DNPH to form hydrazones, which were extracted and then separated and quantified using HPLC. The samples were analyzed for nine individual species: formaldehyde, acetaldehyde, acetone, propanal, crotonaldehyde, methylethylketone, butyraldehyde, benzaldehyde, and m-tolualdehyde, plus C_5, C_6 and $>C_6$ aliphatic carbonyls. C_5, C_6, and $>C_6$ aliphatic carbonyls are usually measurable but lower in concentrations compared with the C_1-C_4 carbonyls. Except for the straight chain aldehydes (e.g. pentanal, hexanal, etc.), resolution of the other isomers of C_5 and higher carbonyls is incomplete, and thus inaccurate. These isomers are more appropriately reported as a group by carbon number. Pure DNPH derivatives of the aldehydes and ketones are used to prepare calibration standard for the HPLC.

Field blank variability establishes the LQL (lower quantifiable limit), which for C_1-C_7 carbonyls is typically 0.5 ppb or lower (at 3 times standard deviation of the blank variability). Accuracy of this method is approximately within $\pm$15% for formaldehyde based on comparison studies with long path spectroscopic techniques in an ambient air setting. Since the basic chemistry of the DNPH method is the same for all carbonyls, the accuracy for higher carbonyls are expected to be in the same range.

2.2.3 Particle Collection and Analysis

A four-channel sampler was used to collect particulate samples for mass and chemical analysis. Each channel was able to collect two separate substrate sets. Rotameters and needle valves were used to measure and control the sampling flow rates. Digital timers were used to automate sample collection. Figure 2-6 is a schematic drawing of the sampler. A total of three digital timers were used, one for each pump and one that controlled the solenoid valves. The following collections and measurements were made:

Figure 2-6. Sampler for collecting airborne particulate material.



- **$PM_{2.5}$ Mass**

A Sensidyne model 240 cyclone was used for the $PM_{2.5}$ size cut and it operated at a total flow of 115 L/min. This cyclone has been used in many specialized air quality studies and has a well-characterized cut-point at this flow rate. Copper tubing (1/2 inch OD) was used to split the sample stream and transport the sample from the cyclone to diffuser tubes (1.75mm ID, 30cm long) and then to open-face filter holders using Teflo polyolefin-ringed filters. The diffuser tubes are used to obtain an even deposit on the filter.

Filter weighing was performed at CE-CERT's filter weighing facility. Filters were conditioned and weighed in a 1 cubic meter laminar flow chamber in which the temperature and relative humidity are controlled. A Cahn Model C-35 balance was used for all weighings. The temperature and humidity in the laminar flow hood and equilibration chamber were controlled to 25^{o}C and approximately 40% RH. Filters were equilibrated according to EPA requirements for 24 hours prior to the "blank" (prefield use) weighing and also prior to the "after" field use weighing. The balance used for filter weighing was calibrated with a 200 mg class M NIST-traceable weight before and after each weighing session. The measurement variability was approximately 2 µg.

- **Elemental Analysis**

Open face Teflo polyolefin-ringed filters were used to collect samples for elemental analysis by x-ray fluorescence (xrf). These will therefore be considered samples of total suspended particulate (TSP). A flow rate of 80 L/min was used to maximize the measurement sensitivity. DRI performed the xrf analysis using a Kevex Corporation model 700/8000 energy dispersive X-ray fluorescence analyzer. The concentrations of the following compounds will be measured: Al, Si, P, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, As, Se, Br, Rb, Sr, Y, Zr, Mo, Pd, Ag, Cd, In, Sn, Sb, Ba, La, Au, Hg, Tl, Pb, and U.

- **Hexavalent Chromium (Cr^{+6})**

Cr^{+6} was measured using a modified ARB Method 039. Forty-seven (47) mm Whatman 41 cellulose filters coated with sodium bicarbonate were used to collect a TSP sample. The filters were coated and analyzed by the South Coast Air Quality Management District (SCAQMD). Samples were collected at 20 L/min using a Savillex open face holder. Samples were extracted by sonication in 10 ml of deionized water and analyzed with an ion chromatograph with an ultraviolet detector. Unlike the ARB Method, a concentrator column was used to enhance measurement sensitivity. The detection limit for this sampling volume was approximately 0.07 ng/m^3 for the 12-hour samples.

- **Organic and Elemental Carbon Analysis**

Quartz filters were used to collect PM_{10} samples for organic (OC) and elemental (EC) carbon analysis. The inlet was an Andersen model 245B that had been EPA-certified as equivalent to the PM_{10} reference method. The inlet was modified to accept Savillex 47mm open face filter holders. Separate inlets were used for each pair of filter holders. DRI performed the analysis for OC and EC using a thermal optical reflectance method. Sections of quartz fiber filter substrates were analyzed by thermal volatilization in seven progressive temperatures and two purge gases:

- Ambient to 120 °C under helium.
- 120-250 °C under helium.
- 250-450 °C under helium.
- 450-550 °C under helium.
- 550 °C under 98% helium/2% oxygen mixture.

- 550-700 °C under the helium/oxygen mixture.
- 700-800 °C under the helium/oxygen mixture.

The volatilized carbon was converted to CO_2 by heated manganese dioxide, reduced to methane with a nickel catalyst, and quantified as methane with a flame ionization detector. An optical system was used to correct for pyrolysis during the temperature treatment. This temperature/concentration profiling can be used to characterize the nature of the carbon in the sample by volatility.

2.3 Tracer Release, Collection, and Analysis

- **Tracer Release**

The SF_6 release rate was 4 kg/hr when the tracer study is not being conducted and 16 kg/hr on tracer study days. The tracer gas was released within the National Steel and Shipbuilding Facility (NASSCO) "sandbox" area starting one hour before measurements began (7 a.m.) and ending when the measurements did (8 p.m.). A Campbell CR21 data logger controlled the release time and rate and also recorded the release rate. Pure SF_6 was metered from a compressed gas cylinder using a mass flowmeter calibrated for SF_6. The outlet of the mass flowmeter led to a manifold where it was mixed with ambient air at a flow rate of approximately 20 L/min from a small pump. This provided a gas mixture of the same density as the ambient air. This mixture was directed to a 3/8-inch inside diameter tube of polyethylene tubing. An approximately 4-meter-long piece of this tubing was used to allow for mixing of the air and SF_6 and to allow for the temperature of this mixture to reach that of the ambient air. The outlet from this tube was directed horizontally to ensure, even though the large diameter tubing reduced the sample velocity to 1 meter/second, that the effective sample release height was the same as the height of the outlet of the release system.

- **Tracer Collection**

Tracer samples were collected in bags using a sampler built and used by CE-CERT in the previous Barrio Logan tracer study. This sampler uses a single board computer to control the timing of sample pumps (one for each bag). Up to ten sequential bags can be collected. For this study a sampler was modified to collect two collocated bag samples over a 12-hour period. Replicate samples were collected should a pump fail to start or the bag found to leak.

- **Tracer Measurement**

The bags were analyzed for SF_6 using a gas chromatograph with electron capture detection (ECD) and a 5 ml sample loop. The sensitivity for this method was several ppt.

2.4 Meteorological Measurements

Measurements for wind speed, wind direction, and temperature were initially performed at the tracer release point and site #2 at the Mercardo Apartments (on the roof of the laundry room) for the December sample collections. The unit at site #2 was later moved to site #1 (Logan Memorial School) and then to 3644 Main St. The measurements in January were made at Logan Memorial School. The measurement system included a cup anemometer, a wind vane, and a shielded thermistor. The equipment was mounted on a 5-meter tower at the release point and a 3-meter tower at the other sites. The wind speed and direction and temperature signals were scanned once per second by a Campbell CR10 data logger located at the base of the towers. Data were stored as 15-minute averages.

2.5 Quality Control

- **Work Plan**

A detailed Work Plan was prepared prior to field sampling and reviewed by ARB Staff. This Work Plan is included as Appendix A.

- **Gaseous Samplers**

  - **VOC**

Replicate analyses were made on 10% of the VOC canisters to confirm that the measurements were within the overall precision of the DRI laboratory analyses. The DRI VOC measurement accuracy is determined routinely by analyzing audit canisters provided by the U.S. EPA.

  - **Carbonyl**

All sampling cartridges were from the same lot. Six samples were reanalyzed to determine measurement precision. Four collocated cartridges were collected to determine the overall precision. Four additional cartridges were installed in the sampler to serve to determine the blank contamination level. No flow passed through these cartridges, but they remained in the sampler for the same amount of time as those used to collect samples. All data were corrected for the mean blank. Cartridges were not sampled in series to determine breakthrough since this was not expected to occur under these sampling conditions (K. Fung, 2001). The flows of the DNPH cartridges were determined with bubble meter that has a calibration traceable to NIST standards.

- **PM Sampling Equipment**

PM samplers were calibrated against a transfer rotameter that itself had its calibration traceable to a NIST standard via a volumetric meter. The rotameter was temporarily installed at the inlet to the filter holder with a filter in place. Flow rates determined by the samplers' rotameters were converted to standard conditions of temperature and pressure and compared to the value determined by the transfer rotameter.

Quality control for the filter samplers consisted of a combination several different checks:

- Triple weighing of all filters before and after sampling.
- Field blanks of substrates used for chemical analysis to assess overall blank levels and variability.

- Replicate laboratory analysis to assess analytical precision.

- **Tracer Samples**

A Columbia model 1700 calibrator was used to blend the certified SF_6 calibration gas to the concentration range being measured. The model 1700 was calibrated with a certified dry test meter and bubble flow meter. A single concentration of calibration gas was analyzed every tenth sample as was a zero air sample. At the beginning of each day of analysis the GC was given a multi-point calibration to verify linearity.

- **Meteorological Sensors**

The wind anemometers were calibrated by attaching a synchronous motor to the cup shaft as described in the manual. Factory conversion factors were used to convert rpm to speed and to generate a calibration curve by comparison with the readout of the data logger. The wind sensors were aligned with true north using a compass mounted on a tripod. Response was verified by comparing the data logger output with compass measurements while the sensor was held at the four cardinal directions. The temperature sensor was calibrated by immersing the sensing element in water at ambient temperature in close proximity to a NIST traceable thermometer. The dew point sensor was be calibrated by comparing the response to the value determined using a sling psychrometer

- **Hexavalent Chromium – Coordination with ARB Monitoring and Laboratory Division Chrome Plater Study**

On selected days, the ARB's Monitoring and Laboratory Division also collected samples for hexavalent chromium approximately 100 yards south of site #2. Several duplicate collocated samples were also collected at the Monitoring and Laboratory Division sampling site and measured by the SCAQMD lab. Table 2-1 shows the results of this laboratory comparison. Except for one day when the SCAQMD was significantly lower, the results are in general agreement, given the higher sensitivity reported by the SCAQMD.

Table 2-1. Comparison of hexavalent chromium measurements of collocated samples.

Date	**Hexavalent Chromium Concentration, ng/m^3**	
	ARB Collected 24 Hour, ARB Analyzed	ARB Collected 24 Hour, SCAQMD Analyzed
12/06/01	0.1	0.16
12/07/01	0.3	0.34
12/10/01	0.1	0.05
12/12/01	1.0	0.33
12/14/01	0.1	0.09
12/17/01	0.1	0.06

2.6 Data Processing and Validation

Procedures for data processing and validation were, as much as possible, comparable to those used by Federal, state and local air pollution agencies. This ensured that reported data were valid and comparable. These procedures met the requirements and guidelines of the Environmental Protection Agency as specified in Appendices A and B of 40 CFR 58 and Volumes I and II of the Quality Assurance Handbook for Air Pollution Measurement Systems (U.S. EPA 1984, 1987). Data processing procedures for this program are discussed below.

2.6.1 Data Handling

Data validation followed guidelines described by the U.S. Environmental Protection Agency (U.S. EPA, 1978, 1980). All data were screened for outliers that were not within the physically reasonable (normal) ranges. The following steps, which, except for "comments" notations, were generally applicable only to the meteorological data, were taken:

1. Flagging data when relevant comments were made on the sample collection form or when significant deviations from measurement assumptions occurred. A "comments" column was the method of flagging.
2. Verification computer file entries.
3. Elimination of values for measurements that were known to be invalid because of instrument malfunctions.
4. Adjustment of measurement values for quantifiable calibration or interference biases if necessary and justified.

2.6.2 Data Records

- **Combined Chain of Custody and Data Form**

A chain-of-custody/data form was filled out for each sample collected. It documented sample possession from the time of collection to the time of receipt by the laboratory. Figures 8 and 9 are examples of the forms used for particulate and gas sampling, respectively. The forms included:

- Sample identification number
- Date and time of sampling.
- Flow rate before and after sampling.
- Sampling location.
- Analyses required.
- Sampling technicians' name
- Comments

Figure 8. Example of the particulate sampler data collection form

Project 18494 AIR TOXICS SAMPLING FORM

College of Engineering-Center for Environmental Research and Technology (CE-CERT)

Atmospheric Processes Group — University of California, Riverside CA 92521-0430, 909-781-5791

Field Tech: _____ **Date :** _____

Site 1 - Logan Memorial School

Line #	Aor B	Filter Substrate #	Start Date mm/dd/yy	Start Time xxxx hours	Start Flow Sys (L/min)	Start Flow Ref (SCFH)	End Date mm/dd/yy	End Time xxxx hours	End Flow Sys (L/min)	End Flow Ref (SCFH)	Comments
1											
2											
3											
4											

Site 2 Mercardo Apartments

Line #	Aor B	Filter Substrate #	Start Date mm/dd/yy	Start Time xxxx hours	Start Flow Sys (L/min)	Start Flow Ref (SCFH)	End Date mm/dd/yy	End Time xxxx hours	End Flow Sys (L/min)	End Flow Ref (SCFH)	Comments
1											
2											
3											
4											

Site 3 - Boston Apartments

Line #	Aor B	Filter Substrate #	Start Date mm/dd/yy	Start Time xxxx hours	Start Flow Sys (L/min)	Start Flow Ref (SCFH)	End Date mm/dd/yy	End Time xxxx hours	End Flow Sys (L/min)	End Flow Ref (SCFH)	Comments
1											
2											
3											
4											

Site 4 - NASSCO

Line #	Aor B	Filter Substrate #	Start Date mm/dd/yy	Start Time xxxx hours	Start Flow Sys (L/min)	Start Flow Ref (SCFH)	End Date mm/dd/yy	End Time xxxx hours	End Flow Sys (L/min)	End Flow Ref (SCFH)	Comments
1											
2											
3											
4											

Site 5 - Point Loma

Line #	Aor B	Filter Substrate #	Start Date mm/dd/yy	Start Time xxxx hours	Start Flow Sys (L/min)	Start Flow Ref (SCFH)	End Date mm/dd/yy	End Time xxxx hours	End Flow Sys (L/min)	End Flow Ref (SCFH)	Comments
1											
2											
3											
4											

Sample Line 1: Tared Teflo, use number on Petri dish, target flow rate 240SCFH

Sample Line 2: Untared Teflon, number mmddyy site #, line#, A/B; target flow rate 170 SCFH

Sample Line 3: CO_3 coated Whatman, number mmddyy site #, line#, A/B; target flow rate 42.4 SCFH

Sample Line 4: Quartz, use number on Petri dish; target flow rate 35.4 SCFH

Figure 9. Example of the gas phase sampling form

Project 18494 CARBONYL, VOC AND TRACER SAMPLING FORM
College of Engineering-Center for Environmental Research and Technology (CE-CERT)
Atmospheric Processes Group University of California, Riverside CA 92521-0430, 909-781-5791

Field Tech:

Site 1 - Logan Memorial School

Sampler	ID	Start Date mm/dd/yy	Start Time xxxx hours	Start Meter xx.xx hrs/min	End Date mm/dd/yy	End Time xxxx hours	End Time Meter	Comments
Carbonyl								
VOC								
Tracer								
Tracer								

Site 2 Mercardo Apartments

Sampler	ID	Start Date mm/dd/yy	Start Time xxxx hours	Start Meter xx.xx hrs/min	End Date mm/dd/yy	End Time xxxx hours	End Time Meter	Comments
Carbonyl								
VOC								
Tracer								
Tracer								

Site 3 - Boston Apartments

Sampler	ID	Start Date mm/dd/yy	Start Time xxxx hours	Start Meter xx.xx hrs/min	End Date mm/dd/yy	End Time xxxx hours	End Time Meter	Comments
Carbonyl								
VOC								
Tracer								
Tracer								

Site 4 - NASSCO

Sampler	ID	Start Date mm/dd/yy	Start Time xxxx hours	Start Meter xx.xx hrs/min	End Date mm/dd/yy	End Time xxxx hours	End Time Meter	Comments
Carbonyl								
VOC								
Tracer								
Tracer								

Site 5 - Point Loma

Sampler	ID	Start Date mm/dd/yy	Start Time xxxx hours	Start Meter xx.xx hrs/min	End Date mm/dd/yy	End Time xxxx hours	End Time Meter	Comments
Carbonyl								
VOC								
Tracer								
Tracer								

Carbonyl labeling mmddyy, C,site #,A/B
VOC Labeling: Use can ID
Tracer Labelin: Sampler #, A/B/C, 1/2

- **Logbook**

A logbook was maintained for the project; all relevant calibrations, experimental procedures and observations were recorded. After transferring the data to a spreadsheet maintained on a PC, we applied calibration factors to data. After collection, filter substrates were stored in Petri dishes under refrigeration. A shipping list accompanied all samples to the laboratory, and each movement and change in custody was noted. Concentrations were calculated from the completed filter sampling form using EXCEL spreadsheets.

- **Digital Data**

The meteorological data was collected and stored digitally. The "raw" data files from these instruments were saved "as is." Copies of the raw data files were used for subsequent processing steps to obtain "preliminary" and "final" data (i.e., the "original" data will be preserved for potential future use and reference should there be any questions regarding the final data or for use should either the preliminary or final data files become lost or corrupted).

2.6.3 Data Processing

The meteorological data was processed into 15-minute averages while pollutant monitoring data were processed as 12-hour averages.

3. Sampling Program and Data Collected

3.1 Sampling Program

Table 3-1 shows the sample collection days and times and notes any significant problems or deviations from the schedule at the time of sample collection. Additional data validation was performed after the samples were analyzed. The results from this operation will be discussed in the following section. Due to the two days of light rain on December 14 and 21, two additional days of sampling were conducted in January.

Table 3-1. Summary of sample collection

Date	Comments
12/06/01	Carbonyl did not run full interval at sites # 2, 3, & 4 (initial 2.5, 1.5, & 2.5 hours missing, respectively); Site #4 channels 2-4 (all but $PM_{2.5}$ mass) missing initial 2 hours.
12/07/01	No $PM_{2.5}$ filter installed at site #5.
12/10/01	
12/11/01	
12/12/01	
12/13/01	No quartz filter installed at site #5.
12/14/01	Appeared to have rained, samples not analyzed except $PM_{2.5}$ and Cr^{+6}.
12/17/01	
12/18/01	
12/19/01	
12/20/01	
12/21/01	Appeared to have rained, samples not analyzed except $PM_{2.5}$ and Cr^{+6}.
01/16/02	
01/17/02	Filter sampler at site #1 on at 09:48; Power at site #2 was turned off at approximately 3:30pm for the remainder of the period (7.5 hour duration).

All sample substrates were retrieved the day following collection. All DNPH cartridges and filter substrates were stored under refrigeration prior to and during shipment to the respective laboratory for analysis. Tracer bag samples, VOC canisters and samples for CR^{+6} were returned to their respective laboratories within four days of sampling. Other samples were sent to the laboratories at the end of the measurement program. Meteorological data were retrieved from the Campbell data loggers at the end of the sampling episodes in December and January.

3.2 Data Collected

3.2.1 Meteorological Data

The meteorological data is provided on the diskette included with this report. Data validation required only that data during set up be removed. The sensors were moved twice in December and remained at Logan School in January. The wind direction during the sampling periods was consistently from the west-southwest. The wind speeds were generally low, from 1-2 m/sec. This wind data is typical for coastal flow without major frontal passages.

3.2.2 $PM_{2.5}$ Mass Data

Table 3-2 shows the periods of missing or invalidated data and the reasons why. Appendix B shows the complete set of validated data. There were several periods where, based on the insignificant mass change, the timer appeared to have failed and the data were invalidated. The sampler did not include running time meters for any of the timer controlled circuits. We therefore needed to look at data from the other channels to determine if the $PM_{2.5}$ sample pump timer

failed, which would invalidate only the $PM_{2.5}$ samples or if the solenoid valve time had failed, thus invalidated all of the filter samples.

The primary measurement uncertainty was the flow rate, which was estimated to be ±5%. The mean concentrations averaged over the entire collection period ranged from 14.5 ug/m^3 at site #4 (NASSCO) to 17.6 ug/m^3 at site #1 (Logan Memorial School).

Table 3-2. Missing and invalidated $PM_{2.5}$ data.

Date	Site	Validity	Comments
12/7/01	5	n	No filter collected
12/13/01	5	n	Sampler's timer appeared to have failed
12/14/01	2	n	Sampler's timer appeared to have failed
12/18/01	4	n	Sampler's timer appeared to have failed
12/21/01	3	n	Sampler's timer appeared to have failed
1/16/02	4	n	Torn filter

3.2.3 TSP Elemental Data

Table 3-3 shows periods of missing or invalidated data and the reasons why. Appendix C shows the valid data for selected elements analyzed by xrf that were significantly above the background or were of special interest. The complete data set is provided in the diskette accompanying this report. The flow uncertainty was estimated to be ±5%

The data are dominated by ocean (Na and Cl) and soil derived elements (Al, Si, Fe and Ca). There are modest amounts of sulfur, most likely sulfate derived from combustion activities. Metals that may originate from metal fabrication such as Cr, Ni., and Mo are generally near the detection limit (see Appendix C for the uncertainties). Small, but measurable amounts of lead (Pb) were observed.

Table 3-3. Summary of missing and invalidated elemental data

Date	Site	Validity	Comments
12/7/01	5	n	No filter collected
12/13/01	5	n	Sampler's timer appeared to have failed
12/14/01	2	n	Sampler's timer appeared to have failed
12/18/01	4	n	Sampler's timer appeared to have failed
12/21/01	3	n	Sampler's timer appeared to have failed
1/16/02	4	n	Torn filter

3.2.4 TSP Hexavalent Chromium Data

For this study we used the South Coast AQMD laboratory method for hexavalent chromium, which is different than the standard method used by the ARB. While the method provides a lower detection limit, the accuracy compared to the standard ARB method has not been verified.

We chose to use the SCAQMD laboratory for analysis because we did not expect to observe detectable Cr^{+6} concentrations in the community using the standard ARB methodology over a 12-hour period. Table 3-4 shows periods of missing and invalidated hexavalent chromium data and the reason why. Appendix D shows the valid hexavalent chromium data. Also shown is the total chromium determined from the xrf analysis and its uncertainty.

There are several high anomalies in these data. The most striking are the high concentrations of hexavalent chromium observed at site #5 (Pt. Loma) on December 11th, which was off-scale for the laboratory analytical technique (>8.14 ng/m3). The Pt. Loma site was the background site for this study, and there did not appear to be any nearby sources of hexavalent chromium. On December 11th, total chromium at site #5, measured by XRF, was also the highest concentration of total chromium observed in this study. Since these filters are analyzed by different methods at different laboratories, it is unlikely that the high values are due to laboratory error. Because total chromium and hexavalent chromium are measured on different filters, contamination is also an unlikely cause.

It is possible, however unlikely, that high concentrations on December 11th were due to contamination by sampling apparatus. Site #5 was located immediately above the ocean surf and was often very foggy. This combination resulted in noticeable corrosion on filter sampling hardware. Since the cover and supporting hardware were constructed of galvanized steel and uncoated steel respectively, we do not expect these materials to be sources of hexavalent chromium contamination. It is also possible, however unlikely, that some unobserved transient activity occurred near site #5 on December 11th that generated high concentrations of hexavalent chromium.

Because the observed hexavalent chromium concentration at site #5 on December 11th was so high, we believe it to be suspect. However, because high total chromium concentration was confirmed by XRF on a separate filter, we did not invalidate the hexavalent chromium result.

A second elevated hexavalent chromium concentration was observed on December 13th at site #5. Unfortunately, the XRF total chromium sample on December 13th at site #5 failed, and therefore there was no supporting evidence for the validity of this value. In the absence of information to support the elevated result at site #5 on December 13th, we invalidated the data point.

Neglecting the anomalous values at Pt. Loma and using one half of the detection limit for the measurements below the detection limit, the mean hexavalent chromium concentrations, averaged over the study period, ranged from 0.09 at site #5 (Pt Loma) to 0.27 ng/m^3 at site #2 (Mercado Apartments).

Table 3-4. Summary of missing and invalidated hexavalent chromium data.

Date	Site	Validity	Comments
12/7/2001	4	n	Other values also low, may not have run
12/12/2001	1	n	Did not sample
12/13/2001	5	n	Possible contamination, elements not collecte
12/14/2001	2	n	Sampler's timer appeared to have failed
12/17/2001	5	n	Mixed up with quartz filter
12/18/2001	4	n	Mixed up with quartz filter
12/21/2001	3	n	Sampler's timer appeared to have failed

3.2.5 PM_{10} Elemental and Organic Carbon Data

Table 3-5 shows missing and invalidated data and the reason for the designation. Appendix E shows the valid organic (OC) and elemental (EC) concentrations. The mean OC concentrations averaged over the sampling period ranged from 6.02 ug/m^3 at site #5 (Pt. Loma) to 11.24 ug/m^3 at site #2 (Mercado Apartments).

Table 3-5. Missing and invalidated elemental and organic carbon data.

Date	Site	Validity	Comments
12/7/01	4	n	Low compared to other sites
12/11/01	4	n	Did not sample
12/12/01	1	n	Did not sample
12/13/01	4	n	Did not sample
12/13/01	5	n	No sample collected
1/16/02	1	n	Wrong filter used
1/16/01	5	n	Wrong filter used
1/17/01	5	n	Wrong filter used

3.2.6 VOC Data

The VOC sampler failed to collect three samples at Pt Loma: December 6th, 12th, and 19th. Both hydrocarbon and halocarbon analyses for these dates are therefore missing.

Hydrocarbon Results

The complete data set is provided in the Appendix. Approximately 85% of the hydrocarbons were identified. The analytical precision was estimated from replicate analyses by taking the absolute value of the difference in measurement pairs and dividing by the average concentration of the measurement pair. For most compounds significantly above the detection limit the precision was several percent. Data from three periods from the Pt Loma background site were missing due to the sampler collecting insufficient sample. The background site concentrations were significantly and consistently lower than concentrations measured in Barrio Logan.

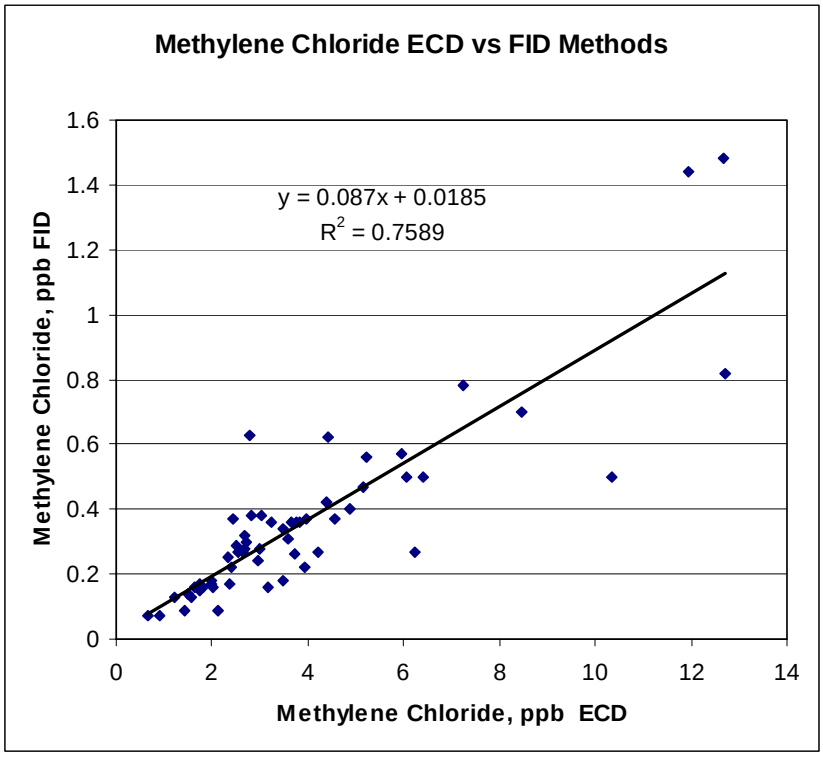
Halocarbon Results

Appendix G contains the validated results for the halocarbons. The Freons were typically in the 0.1-1ppb range which would be typical for ambient air. Replicate analyses were performed on 10% of the canisters. The analytical precision was estimated as a precision by taking the absolute value of the difference in measurement pairs and dividing by the average concentration of the measurement pair. For compounds typically above the detection limit the precision was 1-3% except for 1,2-dichloroethane, which was 21%.

Methylene chloride appeared to be higher than ppb-level concentrations that are normally the highest found in urban atmospheres (B. Zielinska, 2002). Since this compound is also measured by the FID, we compared the results in Figure 3-1. The two measurement methods are weakly correlated, although the correlation can be improved significantly if several of the outliers were removed. The methylene chloride measured by the FID was nearly an order of magnitude lower than that of the ECD. Since both analyses were made from the same canister, sample contamination is not likely to be the cause of the discrepancy. We conclude that the methylene chloride measured by the ECD was subject to a significant and consistent analytical error. For this reason all values were invalidated.

The carbon tetrachloride concentrations were also higher than we would expect in lightly polluted air. The concentrations varied little from day to day or site to site. Since FID cannot be used to measure this compound we were not able to evaluate the accuracy. For this reason the concentrations were all invalidated.

Figure 3-1. Comparison of methylene chloride measurements using FID and ECD detection.



3.2.7 Carbonyl Data

Appendix H contains the validated carbonyl data. For carbonyls both duplicate samples and replicate analyses were performed to estimate the precision of the method. The precision was calculated from these pairs as described in the VOC results. For compounds typically above the detection limit the replicate precision was typically 4% except for MEK, which was twice as high. The duplication precision varied from 1.7 to 14.6%,

The concentrations of formaldehyde appear low for lightly polluted ambient air, in which they are also generally higher than acetaldehyde. This method used DNPH coated silica gel sampling tubes. As recommended by the EPA protocol, a diffusion scrubber was installed at the inlet of the sampler to remove ozone, which has been shown to bias the formaldehyde measurements low. The laboratory providing the sampling equipment performing the analysis (and fabrication of the ozone remover) was not familiar with this method. We subsequently evaluated an ozone scrubber we used and found that it did not remove a significant amount of ozone. Due to the lower than expected concentrations and failure of the ozone scrubber, all of the formaldehyde measurements were designated as invalid.

3.2.8 SF_6 Tracer Data

Table 3-6 shows the average concentration of SF_6 tracer gas in the bags that were collected over the 12-hour sampling period corrected for the global background. Replicate analysis showed a relative precision of approximately 10%. The concentrations at Pt. Loma may be due to measurement uncertainty, unknown local sources, or reflect long-range transport of tracer gas from the release site to monitoring location through regional circulation patterns. The highest concentrations were found at NASSCO and the Boston Apartments. This is expected since both sites were close and downwind of the release point. The SF_6 concentrations at the Mercado Apartments and the Logan Memorial School were significantly above the background but much lower. This would be expected since neither was downwind from the release point and both were farther away.

Table 3-6. Average SF_6 concentration at each measurement site

		Average SF6 Concentration (parts per trillion)				
	SF6 Release Rate	Site #1	Site #2	Site #3	Site #4	Site # 5
Sample Date	Rate, Kg/hr	Logan Memorial	Mercado Apts	Boston Apts	NASSCO	Pt Loma
12/6/2001	4	7.5	142.5	10	43	5.5
12/7/2001	4	368	141	114.5	1841.5	12
12/10/2001	4	55	13	8	32	7
12/11/2001	4	3	2	2	5	1
12/12/2001	4	6	4	12	3	1
12/13/2001	4	4	12	97	27	1
12/14/2001	4	1	7	10	8	5
12/17/2001	16	92	25	2528	66	15
12/18/2001	16	58	143	559	639	28
12/19/2001	16	31	13	293	182	8
12/20/2001	4	31	22	31	7894	17
12/21/2001	16	16	24	9	258	13
1/16/2002	3.8	43	25	59	687	3
1/17/2002	3.8	53	30	275	1375	2

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APPENDIX A
WORKPLAN

Measurement of Toxic Air Pollutants During Tracer Studies

WORK PLAN FOR BARRIO LOGAN MEASUREMENT STUDY

November 30, 2001

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1. Introduction

1.1 Study Objectives

Under existing funding, UC Riverside will be conducting tracer studies in Neighborhood Assessment Program (NAP) communities to evaluate models used to predict concentrations of toxic emissions due to nearby sources (kilometer distance). For this study, SF_6 tracer gas will be released on the site of a significant emission source of toxic air pollutants in each evaluated NAP community. The gas will be released, as much as possible, in or near the source with the highest or nearly the highest emission rate on the facility. Approximately 50 tracer samplers will be located from 0.5 to 2.0 kilometers from the release point. These samplers will sequentially collect ten time-integrated one-hour samples in bags. The bags will then be analyzed for SF_6 content at a central facility equipped with gas chromatographs using electron capture detection.

The primary objective of this study is to evaluate emissions inventory and dispersion modeling that has been developed for the Barrio Logan community. Secondary objectives include identifying pollutant concentrations at receptors in the community and conducting limited source apportionment. This study will overlap with the tracer study being conducted in Barrio Logan during December 2001. It is anticipated that some of the pollutants will be from the source where the SF_6 is released and some may not. With detailed chemical speciation, source-receptor modeling can be used to determine the impact from various types of sources.

1.2 Approach

Five monitoring locations will be selected in accordance with the following criteria:

1. Locations where significant impact is expected from the emission source where the tracer is released.
2. Locations where complaints from residents have been reported.
3. Locations were sensitive subjects spend considerable time (such as schools).
4. Adequate power and security.
5. Collocated with SF_6 sampling locations for the tracer program.

In addition, one site will be upwind of the prevailing on-shore flow to serve as a background. One sample will be collected per day to match periods of on-shore wind flow. A minimum of 12 samples will be taken at each site in each community.

Samplers will be used that automatically collect a sample for twelve hours (8 a.m. to 8 p.m.). Samples will be collected only on weekdays, and will avoid holiday periods when major emissions sources will not be operating (12/24 – 1/2). Samples will be taken as weather permits. Samples will not be taken if meteorological forecasts, provided by ARB from the San Diego Air Pollution Control District, predict wind speeds to exceed 15 knots, significant rainfall above drizzle conditions, or persistent easterly winds. If after taking samples on any given day weather

conditions did not meet these criteria, the samples will not be analyzed. This decision would be made both by ARB and UCR staff.

The samplers will have timers to automatically start and stop sampling. Substrates will be changed manually after each day of sampling. The samplers will be collocated with the tracer study's SF_6 samplers. Since the tracer study will occur on only five of the 12 toxics sampling days, an additional SF_6 sampler will be located on site that will collect one 12-hour sample each collection day.

Each sampling site will have the following equipment:

- Two tracer bag samplers, one for collecting a single 12-hour sample, the other for collecting one-hour samples during the tracer study days.
- VOC canister sampler (the automated instrument developed by the Desert Research Institute). These samplers used SUMMA® polished canister cleaned according to EPA method TO-14.
- Carbonyl sampler (2,4-dintrophenylhyrazine coated adsorbent cartridges). The automated instrument developed by AttMA will be used.
- A customized particulate sampler with TSP, PM_{10} and $PM_{2.5}$ inlets that collect particulate samples on the following substrates:
    - Teflo Filter for $PM_{2.5}$ at 115 L/min (mass).
    - Teflo Filter for TSP at 80 L/min (xrf elements).
    - Quartz Filter PM_{10} at 16.7 L/min (OC/EC).
    - Bicarbonate Impregnated Cellulose Filter for TSP at 20 L/min (Cr^{+6}).
- Anemometer and data logger for wind speed and direction (two sites only)

1.3 Scope of Work

This project will consist of the following tasks:

- Work Plan to describe the measurement program.
- Locate and obtain permission to use five appropriate measurement sites.
- Provide and install five samplers to collect samples for:
    - VOC.
    - Carbonyls.
    - $PM_{2.5}$ mass.
    - Particulate metals.
    - PM_{10} organic and elemental carbon.
    - Particulate $^{Cr+6}$.

- Install anemometers and data loggers at two sites.
- Collect daily samples for 12-15 days.
- Analyze samples.
- QC sample analysis and convert to concentration units.
- QC Meteorological data.
- Report to present data collection methodology, data, and a summary of the quality and quantity of the data collected.

2. Organization and Responsibility

An organizational chart for this project is presented in Figure 2-1.

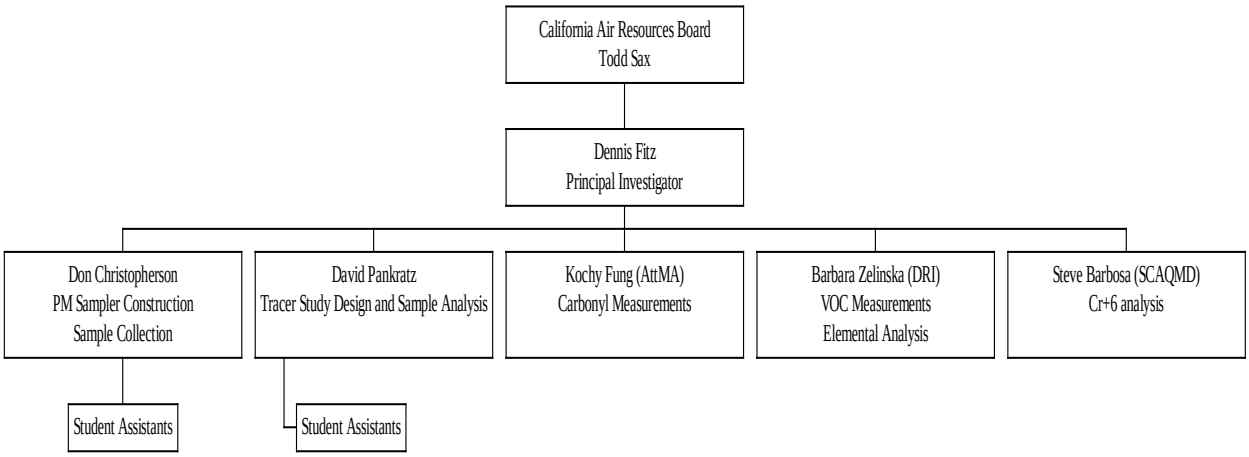


Figure 2-1. Project organization.

3. Quality Assurance Objectives and Corrective Action for the Measurement Program

This section defines the data quality goals for the project and the quality control activities necessary to obtain them. These goals are stated in terms of precision, accuracy and completeness.

3.1 Quality Assurance Objectives for Measurement Data

Table 3-1 shows the data quality objectives and acceptance criteria for the measurements to be made in this project.

Table 3-1 Data quality objectives.

Measurement	Completeness	Accuracy	Precision	Detection Limit
VOC	90%	±10%	10%	PpbC
Carbonyls	90%	±15%	10%	0.1 ppbC
$PM_{2.5}$ Mass	90%	± 10%	10%	1μg/m^3
Elements	90%	± 10%	10%	Varies
Cr^{+6}	90%	± 10%	10%	0.07ng/m^3
OC/EC	90%	± 10%	10%	0.1μg/m^3
Tracer Gas	90%	± 10%	10%	1pptV
Wind Direction	95%	±10%	2%	1°
Wind Speed	95%	±10%	5%	0.5 m/s1°
Temperature	95%	±10%	1%	1°C

Completeness will be calculated based on the number of hours of data planned. Accuracy will be determined by comparison with audit measurements. Precision will be determined from collocated sampling and measurements.

3.2 Corrective Action

Corrective action will be initiated whenever a problem is identified. The goal of corrective action is to remedy any problem before the project or equipment and/or parameters drop below the desired accuracy, precision, or completeness.

To minimize the need to take corrective action, all equipment to be used on this program will be serviced prior to field use. Flow rate data on the integrated filter samplers; calibration checks on the SF_6 instruments, and comparison of the visual observations to measured meteorological data will be used to check that these instruments are operating within the desired accuracies. Once a problem has been identified, the person who found it will either fix it himself or request the project manager's assistance.

4. Measurement Procedures

The project team will perform air quality and meteorology field measurements in the Barrio Logan area of San Diego, CA.

4.1 Site Selection

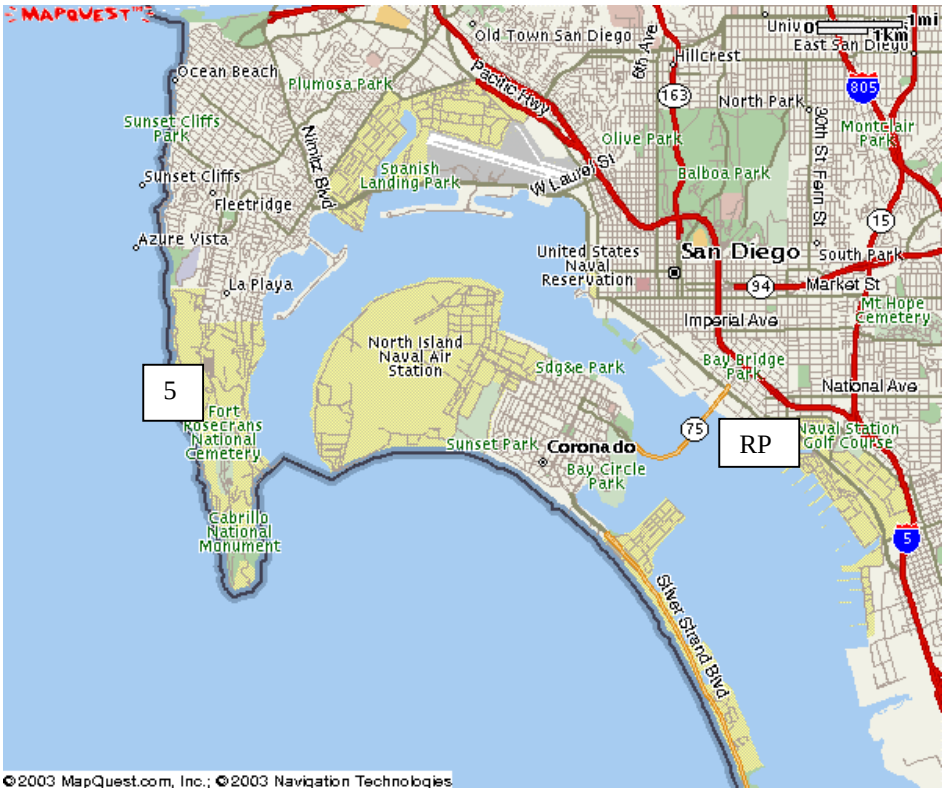
The criteria for site selection include:

- Free of nearby obstructions to air flow.
- Power availability.
- Reasonable security.
- Appropriate receptor or background position.
- Site permission.
- Cost.

Sampling locations will be chosen as a part of the tracer study while applying the criteria mentioned above. The help of the Environmental Health Coalition will be requested for site selection. Adequate power and security are essential for these costly samplers. The ARB will confirm the site selection choices. The following locations, shown in Figure 4-1, are proposed:

- Across Harbor Boulevard in close proximity to NASSCO. ARB models predict elevated concentrations of hexavalent chromium, manganese, nickel, and diesel particulate in close proximity to NASSCO. This location will be as close as possible to NASSCO to validate these model results.
- Between 28th and 30th Street on Boston Avenue. This site would measure concentrations at houses on a street where people live. The site may be impacted by NASSCO and should be impacted by emissions from vehicles on Interstate 5.
- Memorial Academy Charter School. This site would be the same location as the previous monitor in the community, which measured for one and one-half years. Measuring at this site will allow for comparisons to this data, even though sample durations will be different (12 vs. 24 hours).
- Near the Mercado Apartments. The Mercado Apartments house a substantial number of residents in Barrio Logan and represent many receptors in the community. It is potentially affected by the Coronado Bridge, and by local emission sources. It also would be collocated with hexavalent chromium sampling equipment as part of the ARB Monitoring and Laboratory Division study.
- Point Loma collocated with the San Diego Air Pollution Control District site. This site will represent background pollutant concentrations.

Figure 4-1. Maps of proposed sampling locations.



4.2 Collection and Analysis Methods

4.2.1 Volatile Organic Carbon

Stainless steel SUMMA®-polished canisters of 6 L capacity will be employed for volatile hydrocarbon (C_2-C_{12}) collection. Integrated air samples over the sampling period will be collected directly using a stainless steel pump with Viton diaphragm. An electronic timer is used to automatically fill the canisters.

The Desert Research Institute (DRI) of the University of Nevada will analyze the canisters for VOC. Hydrocarbons in the air from the sampling canister are concentrated in a freeze-out trap immersed in liquid oxygen. The contents of the trap are then immersed in boiling water and injected into a Hewlett-Packard model 5890 series II gas chromatograph equipped with either a J&W DB-1 fused silica capillary column (for compounds $>C_4$) or a J&W GS-Alumina PLOT fused silica capillary column (for C_2 to C_4 compounds) and a flame ionization detector. Up to 160 compounds can be identified by retention time with a lower quantifiable limit of 0.1 ppbC.

4.2.2 Carbonyl Compounds

Atmospheric Measurement Associates (AttMA will provide the carbonyl sampler and analyze the collected substrates. The measurement technique used in this study is a variant of EPA Method TO-11. Carbonyls are collected on C18 Sep-Pak cartridges (Waters/Millipore Corp., Milford, MA) which have been impregnated with acidified 2,4-dinitrophenylhydrazine (DNPH) reagent for ambient sampling. The amounts of both the hydrazine and acid are optimized to achieve efficient collection of the carbonyl compounds and protection from ozone destruction of the captured carbonyl derivative. Air is drawn through the cartridge at 1 L/min, carbonyls in the air sample are captured by reacting with DNPH to form hydrazones, which are extracted and then separated and quantified using HPLC. The samples will be analyzed for nine individual species: formaldehyde, acetaldehyde, acetone, propanal, crotonaldehyde, methylethylketone, butyraldehyde, benzaldehyde, and m-tolualdehyde, plus C_5, C_6 and $>C_6$ aliphatic carbonyls. C_5, C_6, and $>C_6$ aliphatic carbonyls are usually measurable but lower in concentrations compared with the C_1-C_4 carbonyls. Except for the straight chain aldehydes (e.g. pentanal, hexanal, etc.), resolution of the other isomers of C_5 and higher carbonyls is incomplete, and thus inaccurate. They are more appropriately reported as a group by carbon number. Pure DNPH derivatives of the aldehydes and ketones are used to prepare calibration standard for the HPLC.

Field blank variability establishes the LQL (lower quantifiable limit), which for C_1-C_7 carbonyls is typically 0.5 ppb or lower (at 3 times standard deviation of the blank variability). Accuracy of this method is approximately within $\pm$15% for formaldehyde based on comparison studies with long path spectroscopic techniques in an ambient air setting. Since the basic chemistry of the DNPH method is the same for all carbonyls, the accuracy for higher carbonyls are expected to be in the same range.

4.2.3 Particle Collection and Analysis

A four-channel sampler will be used to collect particulate samples for mass and chemical analysis. Each channel will be able to collect two separate substrates. Rotameters and needle valves will be used to measure and control the sampling flow rates. A digital timer will be used to automate sample collection. Figure 4-2 is a schematic drawing of the sampler. The following collections and measurements will be made:

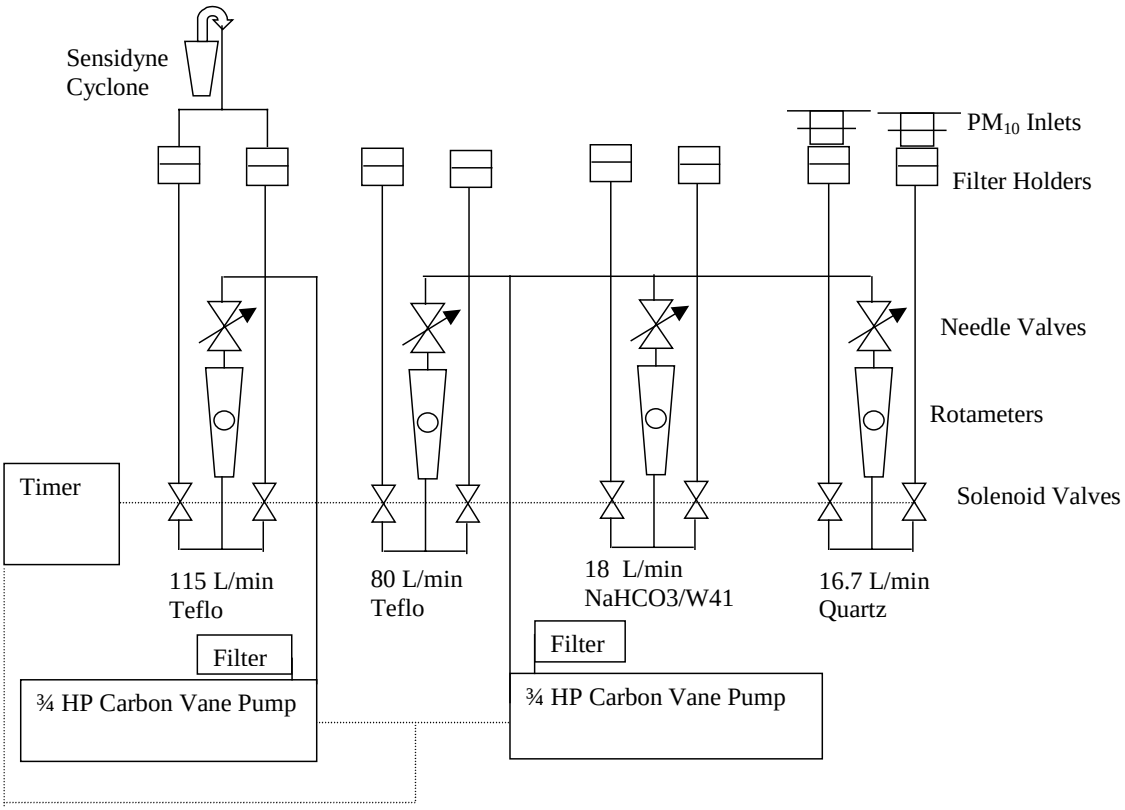


Figure 4-2. Sampler for collecting airborne particulate material.

- **$PM_{2.5}$ Mass**

A Sensidyne model 240 cyclone will be used for the $PM_{2.5}$ size cut and it will operate at a total flow of 115 L/min. This cyclone has been used in many specialized air quality studies and has a well characterized cut-point at this flow rate. Copper tubing (1/2 inch OD) will be used to split the sample stream and transport the sample from the cyclone to diffuser tubes (1.75mm ID, 30cm long) and then to open-face filter holders using Teflo polyolefin-ringed filters. The diffuser tubes are used to obtain an even deposit on the filter.

Filter weighing will be performed at CE-CERT's filter weighing facility. The facility includes a room dedicated to filter weighing. Filters are conditioned and weighed in a 1 cubic meter laminar flow chamber in which the temperature and relative humidity are controlled. A Cahn Model C-35

balance is used for all weighings. The temperature and humidity in the laminar flow hood and equilibration chamber are controlled to 25^{o}C and approximately 40% RH. Filters are equilibrated for 24 hours prior to the "blank" (prefield use) weighing and also prior to the "after" field use weighing. The balance used for filter weighing is calibrated with a 200 mg class M NIST-traceable weight before and after each weighing session. The measurement variability is approximately 2 µg.

- **Elemental Analysis**

Open face Teflo polyolefin-ringed filters will be used to collect samples for elemental analysis by xrf. These will therefore be considered samples of total suspended particulate (TSP). A flow rate of 80 L/min will be used to maximize the measurement sensitivity. DRI will perform the xrf analysis using a Kevex Corporation model 700/8000 energy dispersive X-ray fluorescence analyzer. The concentrations of the following compounds will be measured: Al, Si, P, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, As, Se, Br, Rb, Sr, Y, Zr, Mo, Pd, Ag, Cd, In, Sn, Sb, Ba, La, Au, Hg, Tl, Pb, and U.

- **Hexavalent Chromium (Cr^{+6})**

Cr^{+6} will be measured using a modified ARB method 039. 47 mm Whatman 41 cellulose filters coated with sodium bicarbonate are used to collect a TSP sample. The filters will be coated and analyzed by the South Coast Air Quality Management District (SCAQMD). Samples will be collected at 20 L/min using a Savillex open face holder. Samples are extracted by sonication in 10 ml of deionized water and analyzed with an ion chromatograph with an ultraviolet detector. A concentrator column is used to enhance measurement sensitivity. The detection limit for this sampling volume is approximately 0.07 ng/m^3 for a 12 hour sample.

- **Organic and Elemental Carbon Analysis**

Quartz filters will be used to collect PM_{10} samples for organic (OC) and elemental (EC) carbon analysis. The inlet is an Andersen model 245B that has been EPA-certified as equivalent to the PM_{10} reference method. The inlet was modified to accept Savillex 47mm open face filter holders. Separate inlets are used for each pair of filter holders. DRI will perform the analysis for OC and EC using a thermal optical reflectance method. Sections of quartz fiber filter substrates will be analyzed by thermal volatilization in seven progressive temperatures and two purge gases:

  - Ambient to 120 °C under helium.
  - 120-250 °C under helium.
  - 250-450 °C under helium.
  - 450-550 °C under helium.
  - 550 °C under 98% helium/2% oxygen mixture.
  - 550-700 °C under the helium/oxygen mixture.

- 700-800 °C under the helium/oxygen mixture.

The volatilized carbon is converted to CO_2 by heated manganese dioxide, reduced to methane with a nickel catalyst, and quantified as methane with a flame ionization detector. An optical system is used to correct for pyrolysis during the temperature treatment. This temperature/concentration profiling is used to characterize the nature of the carbon in the sample by volatility.

4.3 Tracer Release, Collection, and Analysis

- **Tracer Release**

The SF_6 release rate will vary between 4 kg/hr when the tracer study is not being conducted and 16 kg/hr on tracer study days. The tracer release will start one hour before measurements begin (7 a.m.) and end when the measurements do (8 p.m.), and will be released within the National Steel and Shipbuilding Facility (NASSCO) "sandbox" area. A Campbell CR21 data logger will control the release time and rate; it also will record the release rate. Pure SF_6 will be metered from a compressed gas cylinder using a mass flowmeter calibrated for SF_6. The outlet of the mass flowmeter will be led to a manifold where it will be mixed with ambient air at a flow rate of approximately 20 L/min from a small pump. The SF_6 will be mixed with the ambient air to provide a gas mixture of the same density as the ambient air. This mixture will be directed to a 3/8-inch inside diameter tube of polyethylene tubing. An approximately 4-meter-long piece of this tubing will be used to allow for mixing of the air and SF_6 and to allow for the temperature of this mixture to reach that of the ambient air. The outlet from this tube will be directed horizontally to ensure, even though the large diameter tubing will reduce the sample velocity to 1 meter/second, that the effective sample release height will be the same as the height of the outlet of the release system.

- **Tracer Collection**

Tracer samples will be collected in bags using a sampler built and used by us in the previous Barrio Logan tracer study. This sampler uses a single board computer to control the timing of sample pumps (one for each bag). Up to ten sequential bags can be collected. For this study a sampler will be modified to collect two collocated bag samples over a 12-hour period. These replicate samples are collected should a pump fail to start or the bag found to leak.

- **Tracer Measurement**

The bags will be analyzed for SF_6 using a gas chromatograph with electron capture detection (ECD). A 5 ml sample loop will be used during periods in which the tracer study is conducted since this method provides adequate sensitivity (10 ppt) at the higher release rate. A 100 ml trap immersed in liquid argon will be used to analyze the SF_6 during periods when the lower release rate is used. The sensitivity for this method is less than 1 ppt.

4.4 Meteorological Measurements

Measurements for wind speed, wind direction, and temperature will be performed at the tracer release point, the 28th Street and Boston location, and the Mercado Apartments. This system will include a cup anemometer, a wind vane, and a shielded thermistor mounted on a 3-meter tower. The wind speed and direction and temperature signals will be scanned once per second by a Campbell CR10 data logger located at the base of the tower. Data will be stored as hourly averages.

4.5 Quality Control

- **Gaseous Samplers**

Replicate analyses will be conducted on three canisters to confirm that the measurements are within the overall precision of the DRI laboratory analyses. The DRI VOC measurement accuracy is determined routinely by analyzing audit canisters provided by the U.S. EPA.

Three collocated cartridges will be analyzed to confirm that the precision is within the overall precision of the AttMA laboratory. Three additional cartridges will be installed in the sampler to serve to determine the blank contamination level. No flow will pass through these cartridges, but they will remain in the sampler for the same amount of time as those used to collect samples. The flow of the DNPH will be determined with bubble meter that has a calibration traceable to NIST standards.

- **PM Sampling Equipment**

PM samplers will be calibrated against a transfer rotameter that itself has its calibration traceable to a NIST standard via a volumetric meter. The rotameter will be installed at the inlet to the filter holder with a filter in place. Flow rates determined by the samplers' rotameters will be converted to standard conditions of temperature and pressure and compared to the value determined by the transfer rotameter.

Quality control for the filter samplers will consist of a several different checks:

- Triple weighing of all filters before and after sampling.
- Field blanks (3-5%) to assess overall blank levels and variability.
- Collocated field samples (10%) to assess measurement precision.

- **Tracer Samples**

A Columbia model 1700 calibrator will be used to blend the certified SF_6 calibration gas to the concentration range being measured. The model 1700 is calibrated quarterly with a certified dry test meter and bubble flow meter. A single concentration of calibration gas will be analyzed every tenth sample as will a zero air sample. At the beginning of each day of analysis the GC will receive a multi-point calibration to verify linearity.

- **Meteorological Sensors**

The wind anemometers will be calibrated by attaching a synchronous motor to the cup shaft as described in the manual. Factory conversion factors to convert rpm to speed will be used to generate a calibration curve by comparison with the readout of the data logger. Application of this calibration will be applied, if necessary, during data post processing. The wind sensors will be aligned with true north using a compass mounted on a tripod. Response will be verified by comparing the data logger output with compass measurements while the sensor is held at the four cardinal directions. The temperature sensor will be calibrated by immersing the sensing element in water in close proximity to a NIST thermometer. Three nominal temperatures will be used, 0, 20, and 40 °C. The dew point sensor will be calibrated by comparing the response to the value determined using a sling psychrometer.

- **Hexavalent Chromium – Coordination with ARB Monitoring and Laboratory Division Chrome Plater Study**

The ARB Monitoring and Laboratory Division will be conducting sampling for Cr^{+6} over 13 days beginning December 3rd and ending December 17th (MLD Study). Samples will be collected Monday through Saturday of each week, and each sample will be collected over a 24 hour period on 37 mm filters using a Xontech 920. Samples will be measured by extraction with 15 ml of deionized water and analysis using an ion chromatograph. MLD has published a 0.2 ng/m^3 detection limit over a 24 hour period at 10 liters per minute. Because different laboratories will be analyzing Cr^{+6} samples and will be using slightly different sampling and analytical techniques, results from the MLD study will not be directly comparable to those from this study. To increase comparability, the following two actions will be taken. First, MLD will colocate two Cr^{+6} samplers at the Mercado apartments, in close proximity to the monitor placed at the Mercado apartment site for this study. One sample will be coated and analyzed by ARB, and the other will be coated and analyzed by SCAQMD. Colocated samples for the MLD study will be taken every other day. Eight SCAQMD coated filters will be provided to MLD staff for this sampling effort, and MLD staff will return to UCR staff eight samples for SCAQMD analysis. Second, a Cr^{+6} analysis comparison check will be conducted between the ARB MLD Laboratory and the SCAQMD Laboratory. MLD will provide identical sets of multiple filters spiked with known concentrations of Cr^{+6} to both MLD and SCAQMD lab staff. Each lab will then analyze the filters in order to compare analytical results. Results from the colocated samplers and from the analysis comparison check will be used to allow improved comparisons between the MLD study and this study.

5. Data Reduction, Validation, and Reporting

The objective of the data processing and validation effort is to obtain a quality assured data base containing the gaseous monitoring data in a consistent format. The procedures that our team will use for data processing and validation ensure that reported data are valid and comparable, as much as possible, to those collected by federal, state and local air pollution agencies. These procedures meet the requirements and guidelines of the Environmental Protection Agency; e.g., Appendices A and B of 40 CFR 58; Quality Assurance Handbook for Air Pollution Measurement Systems, Volumes I and II (1984, 1987b). Data processing procedures for this program are discussed below.

5.1 Data Handling

Data validation will follow guidelines described by the U.S. Environmental Protection Agency (U.S. EPA, 1978, 1980). The validity of the data will be checked as follows: Data will not be removed unless there is a good reason or the measurement is physically impossible. All data will be screened for outliers that are not within the physically reasonable (normal) ranges. We will take the following steps:

5. Flagging data when significant deviations from measurement assumptions have occurred.
6. Verifying computer file entries.
7. Eliminating values for measurements that are known to be invalid because of instrument malfunctions.
8. Adjustment of measurement values for quantifiable calibration or interference biases.

5.2 Data Records

- **Combined Chain of Custody and Data Form**

A chain-of-custody/data form is filled out for each sample collected. It documents sample possession from the time of collection to the time of receipt by the laboratory. It includes:

sample identification number

- Date and time of sampling.
- Flow rate before and after sampling.
- Sampling location.
- Analyses required.
- Sampling team members' names and appropriate signatures.
- Shipping date and time.
- Sample expiration date.

- **Logbook**

A logbook will be maintained at the site; all relevant calibrations, experimental procedures and observations will be recorded. If necessary and after transferring the data to a spreadsheet maintained on a PC, we will apply calibration factors to data. After collection, filter substrates will be stored in Petri dishes for storage under refrigeration. A copy of the sampling form will accompany the sample and each movement and change in custody will be noted on this form. PM concentrations will be calculated from the completed filter sampling form and also entered into the spreadsheet.

- **Digital Data**

The meteorological data will be collected and stored digitally. The "raw" data files from these instruments will be saved "as is." Copies of the raw data files will be used for subsequent processing steps to obtain "preliminary" and "final" data (i.e., the "original" data will be preserved for potential future use and reference should there be any questions regarding the final data or for use should either the preliminary or final data files become lost or corrupted).

5.3 Data Processing

The meteorological and tracer gas data will be processed into 1-minute averages while PM data will be processed as a 12-hour average.

6. Reporting

We will prepare a comprehensive report for the field program. This report will include a description of the measurements and data accuracy, precision and completeness. The report will include the validated program data. The report will include a description of measurement problems and applicability and changes to the protocols for subsequent studies.

7. Program Operation

Sample substrates will be retrieved the day following collection. All DNPH cartridges and filter substrates will be stored under refrigeration prior to and during shipment to the respective laboratory for analysis. Tracer bag samples, VOC canisters and samples for CR^{+6} will be returned to their respective laboratories within four days of sampling. Other samples will be sent to the laboratories at the end of the measurement program. Meteorological data will be retrieved from the Campbell data loggers at the end of the sampling program.

8. Schedule

The schedule is shown in the following table:

Action	Date
Start sample collection	12/5/01
End sample collection	12/21/01
Complete sample analyses	3/1/02
Complete data QC	4/1/02
Submit draft report	5/1/02
Submit final report	8/1/02

9. References

U.S. Environmental Protection Agency (1978) Screening Procedures for Ambient Air Quality Data. Document EPA-450/2-78-037. Office of Air Quality Planning and Standards, Research Triangle Park NC 27711.

U.S. Environmental Protection Agency (1980) Validation of Air Monitoring Data. Document EPA-600/4-80-030. Environmental Monitoring and Support Laboratory, Research Triangle Park, NC.

APPENDIX B
$PM_{2.5}$ MASS VALID DATA

Date	Site	ug/m3
12/6/2001	1	32.8
	2	19.2
	3	18.9
	4	29.3
	5	25.9
12/7/2001	1	9.8
	2	9.9
	3	10.0
	4	13.6
12/10/2001	1	5.9
	2	3.3
	3	16.7
	4	10.4
	5	4.2
12/11/2001	1	12.1
	2	14.3
	3	8.5
	4	5.6
	5	7.3
12/12/2001	1	8.8
	2	29.5
	3	8.3
	4	4.9
	5	20.2
12/13/2001	1	43.5
	2	13.4
	3	12.1
	4	55.6
12/14/2001	1	7.8
	3	6.7
	4	21.3
	5	47.9
12/17/2001	1	16.5
	2	17.4
	3	22.7
	4	10.4
	5	5.4
12/18/2001	1	24.8
	2	25.0
	3	26.7
	5	10.2
12/19/2001	1	25.9
	2	24.4
	3	25.8
	4	4.8
	5	39.1
12/20/2001	1	30.3
	2	13.0
	3	9.8
	4	10.3
	5	13.2
12/21/2001	1	3.8
	2	3.3
	4	4.9
	5	4.9
9/6/2002	1	8.4
	2	8.2
	3	13.5
	5	8.8
9/7/2002	1	14.3
	2	20.3
	3	18.3
	4	41.0
	5	9.8

APPENDIX C
TSP ELEMENTAL VALID DATA (Na-As)

		Na	Mg	Al	Si	P	S	Cl	K	Ca	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	As
Date	Site	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3
12/6/2001	1	0.08	0.13	1.46	5.08	0.000	0.38	1.46	0.65	2.39	0.16	0.004	0.003	0.034	2.36	0.001	0.002	0.040	0.135	0.000	0.000
	2	0.11	0.11	1.08	3.64	0.000	0.35	1.17	0.44	1.21	0.12	0.007	0.005	0.040	1.57	0.000	0.003	0.032	0.093	0.000	0.000
	3	0.08	0.09	1.18	4.48	0.000	0.32	1.18	0.48	1.64	0.11	0.001	0.003	0.025	1.72	0.002	0.006	0.062	0.135	0.000	0.001
	4	0.00	0.16	1.90	6.30	0.000	0.28	1.36	0.60	2.36	0.39	0.003	0.005	0.330	5.85	0.009	0.005	0.106	0.508	0.000	0.001
	5	0.53	0.42	0.44	1.46	0.000	0.74	10.48	0.60	0.87	0.04	0.004	0.002	0.009	0.61	0.001	0.002	0.012	0.033	0.000	0.000
12/7/2001	1	0.53	0.12	1.41	4.86	0.000	0.96	2.25	0.61	1.58	0.18	0.002	0.004	0.096	2.97	0.002	0.003	0.050	0.238	0.000	0.000
	2	0.60	0.12	1.04	3.34	0.000	1.02	1.91	0.48	1.16	0.14	0.002	0.005	0.070	1.80	0.001	0.002	0.034	0.168	0.000	0.000
	3	0.51	0.14	1.38	4.62	-0.001	0.77	2.81	0.55	1.55	0.17	0.003	0.003	0.106	2.89	0.003	0.003	0.063	0.237	0.000	0.000
	4	0.09	0.19	1.23	3.71	0.000	0.36	2.69	0.51	1.16	0.24	0.000	0.004	0.280	4.02	0.004	0.004	0.061	0.361	0.000	0.001
	5	1.33	0.39	0.32	1.11	0.000	0.55	14.48	0.45	0.77	0.04	0.003	0.001	0.006	0.43	0.001	0.001	0.003	0.008	0.000	0.000
12/10/2001	1	0.30	0.19	0.41	1.49	0.000	0.37	4.08	0.30	0.61	0.06	0.002	0.002	0.032	0.83	0.000	0.003	0.015	0.080	0.000	0.000
	3	0.15	0.15	0.56	2.11	0.021	0.35	2.51	0.36	0.87	0.10	0.000	0.001	0.066	1.28	0.001	0.004	0.028	0.144	0.000	0.000
	4	0.11	0.20	1.19	3.39	0.000	0.35	2.69	0.50	1.12	0.24	0.000	0.002	0.288	4.03	0.001	0.004	0.061	0.350	0.000	0.001
	5	1.08	0.20	0.02	0.07	0.000	0.28	8.14	0.16	0.19	0.00	0.001	0.000	0.001	0.03	0.000	0.000	0.001	0.002	0.000	0.000
12/11/2001	1	0.20	0.14	0.74	2.75	0.000	0.42	2.87	0.41	0.96	0.07	0.002	0.004	0.017	1.17	0.001	0.002	0.023	0.065	0.000	0.001
	2	0.31	0.07	0.36	1.37	0.001	0.24	1.95	0.20	0.44	0.05	0.000	0.000	0.018	0.59	0.001	0.001	0.009	0.036	0.000	0.000
	3	0.24	0.07	0.56	1.92	0.000	0.23	1.71	0.27	0.66	0.04	0.000	0.002	0.014	0.72	0.001	0.001	0.013	0.044	0.000	0.000
	4	0.13	0.18	1.73	6.09	0.000	0.43	3.20	0.92	2.33	0.24	0.004	0.004	0.196	4.54	0.006	0.003	0.073	0.289	0.000	0.001
	5	1.22	0.68	0.16	0.67	0.000	0.91	25.89	0.58	1.13	0.06	0.006	0.013	0.009	0.31	0.001	0.002	0.003	0.175	0.000	0.000
12/12/2001	2	0.13	0.21	1.84	6.51	0.000	0.56	4.07	1.06	2.27	0.20	0.004	0.009	0.088	3.62	0.005	0.008	0.090	0.249	0.000	0.000
	3	0.31	0.08	0.48	1.73	0.000	0.25	2.24	0.23	0.58	0.07	0.003	0.004	0.015	0.72	0.001	0.023	0.013	0.051	0.000	0.000
	4	0.00	0.16	2.23	8.13	0.000	0.51	2.99	1.19	3.22	0.33	0.008	0.007	0.176	6.51	0.007	0.005	0.139	0.490	0.000	0.000
	5	0.37	0.18	0.01	0.29	0.009	0.36	5.88	0.29	0.40	0.01	0.005	0.001	0.003	0.22	0.001	0.002	0.003	0.015	0.000	0.000
12/13/2001	1	0.09	0.12	1.32	4.72	0.000	0.34	1.55	0.59	1.42	0.13	0.011	0.004	0.027	1.96	0.002	0.005	0.030	0.093	0.000	0.001
	2	0.16	0.07	0.51	1.68	0.000	0.19	0.93	0.22	0.59	0.12	0.007	0.001	0.017	0.76	0.001	0.003	0.016	0.074	0.000	0.000
	3	0.09	0.08	0.86	3.17	0.001	0.25	1.11	0.39	1.07	0.10	0.004	0.004	0.083	1.61	0.002	0.003	0.036	0.156	0.000	0.000
	4	0.00	0.13	1.44	5.21	0.000	0.43	1.43	0.63	2.15	0.22	0.003	0.001	0.243	4.02	0.004	0.007	0.062	0.510	0.000	0.001
12/17/2001	2	0.13	0.03	0.53	1.84	0.002	0.24	0.86	0.23	0.82	0.05	0.015	0.005	0.014	0.77	0.001	0.007	0.017	0.074	0.000	0.000
	3	0.09	0.11	1.52	5.39	0.000	0.40	1.31	0.70	2.59	0.16	0.012	0.005	0.066	2.72	0.004	0.006	0.053	0.186	0.000	0.001
	4	0.00	0.08	0.89	3.15	0.000	0.26	0.86	0.43	1.69	0.18	0.001	0.002	0.255	3.24	0.004	0.005	0.072	0.464	0.000	0.001
	5	0.71	0.31	0.13	0.42	0.000	0.48	8.55	0.34	0.38	0.01	0.004	0.000	0.002	0.22	0.000	0.002	0.004	0.044	0.000	0.000
12/18/2001	2	0.09	0.08	0.69	2.42	0.000	0.42	1.48	0.29	2.51	0.06	0.006	0.003	0.017	1.03	0.002	0.003	0.019	0.065	0.000	0.000
	3	0.04	0.10	0.96	3.48	0.000	0.38	1.52	0.43	1.36	0.12	0.005	0.003	0.086	2.02	0.003	0.003	0.040	0.214	0.000	0.001
	4	0.08	0.06	0.74	2.38	0.000	0.27	0.94	0.28	0.75	0.07	0.006	0.002	0.017	1.04	0.001	0.003	0.047	0.110	0.000	0.000
	5	0.47	0.34	0.09	0.37	0.000	0.49	7.12	0.36	0.33	0.01	0.002	0.000	0.002	0.18	0.001	0.001	0.003	0.012	0.000	0.000
12/19/2001	2	0.08	0.08	0.87	3.23	0.000	0.52	1.50	0.37	2.83	0.09	0.008	0.002	0.023	1.60	0.001	0.004	0.035	0.100	0.000	0.000
	3	0.00	0.11	1.30	4.72	0.000	0.54	1.65	0.59	2.85	0.17	0.013	0.005	0.119	2.76	0.002	0.008	0.086	0.300	0.000	0.001
	4	0.00	0.05	0.62	2.36	0.000	0.30	0.64	0.26	2.38	0.12	0.004	0.001	0.150	1.92	0.002	0.007	0.056	0.357	0.000	0.000
	5	0.66	0.35	0.32	1.24	0.000	0.56	11.61	0.60	0.49	0.03	0.007	0.002	0.006	0.49	0.001	0.004	0.010	0.040	0.000	0.000
12/20/2001	1	0.46	0.19	0.29	1.17	0.000	0.28	5.56	0.24	0.65	0.03	0.002	0.001	0.012	0.56	0.000	0.000	0.011	0.051	0.000	0.001
	2	0.13	0.06	0.40	1.44	0.000	0.27	1.08	0.17	0.76	0.05	0.001	0.001	0.007	0.53	0.000	0.001	0.010	0.030	0.000	0.000
	3	0.10	0.08	0.78	2.83	0.000	0.34	1.26	0.31	1.59	0.07	0.001	0.002	0.024	0.99	0.000	0.002	0.028	0.084	0.000	0.001
	4	0.00	0.14	1.32	5.05	0.000	0.42	1.73	0.64	2.68	0.29	0.004	0.004	0.292	4.06	0.004	0.005	0.099	0.598	0.000	0.000
1/16/2002	1	0.36	0.11	0.48	1.76	0.000	0.65	2.50	0.29	0.64	0.06	0.003	0.002	0.021	0.85	0.001	0.002	0.013	0.063	0.000	0.000
	2	0.40	0.11	0.43	1.63	0.007	0.65	2.44	0.29	0.61	0.05	0.000	0.002	0.025	0.87	0.001	0.002	0.018	0.083	0.000	0.000
	3	0.29	0.16	1.07	3.45	0.006	0.68	2.70	0.48	1.27	0.13	0.002	0.002	0.101	2.17	0.001	0.002	0.069	0.201	0.000	0.000
	4	0.05	0.09	1.09	4.32	0.000	0.28	1.31	0.43	1.92	0.16	0.000	0.000	0.130	3.47	0.003	0.001	0.047	0.515	0.000	0.000
	5	1.10	0.39	0.08	0.32	0.000	0.90	10.84	0.39	0.45	0.01	0.002	0.000	0.002	0.13	0.000	0.001	0.002	0.010	0.000	0.000
1/17/2002	1	0.23	0.14	0.96	3.13	0.000	0.63	2.00	0.46	1.17	0.11	0.014	0.005	0.057	1.69	0.001	0.006	0.033	0.149	0.000	0.001
	2	0.40	0.20	1.75	6.26	-0.001	0.96	2.77	0.76	2.28	0.18	0.023	0.011	0.097	3.04	0.004	0.016	0.055	0.249	0.000	0.000
	3	0.15	0.17	1.62	5.84	-0.001	0.73	2.17	0.72	2.40	0.19	0.026	0.017	0.110	3.38	0.003	0.014	0.065	0.260	0.000	0.001
	4	0.00	0.18	2.40	8.29	0.000	0.53	1.99	1.05	3.18	0.37	0.018	0.010	0.307	6.69	0.010	0.015	0.113	0.735	0.001	0.000
	5	1.17	0.58	0.22	1.04	0.000	1.14	16.24	0.70	0.91	0.03	0.001	0.000	0.006	0.49	0.001	0.002	0.006	0.026	0.000	0.000

APPENDIX C
TSP ELEMENTAL VALID DATA (SE-U)

		Se	Br	Rb	Sr	Yt	Zr	Mo	Pd	Ag	Cd	In	Sn	Sb	Ba	La	Au	Hg	Ti	Pb	U
Date	Site	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3	ug/m3
12/6/2001	1	0.001	0.012	0.003	0.013	0.001	0.007	0.003	0.000	0.000	0.001	-0.001	0.001	0.007	0.090	-0.003	0.000	0.000	0.000	0.025	0.000
	2	0.001	0.008	0.002	0.010	0.001	0.007	0.002	0.000	0.000	0.000	0.005	0.005	0.005	0.059	0.003	0.000	0.000	0.000	0.013	0.000
	3	0.001	0.008	0.002	0.013	0.001	0.005	0.002	0.002	0.002	0.001	0.001	0.003	0.002	0.109	0.000	0.000	0.000	0.000	0.032	0.000
	4	0.001	0.008	0.004	0.016	0.002	0.014	0.006	0.000	0.001	0.002	-0.001	0.003	0.002	0.099	0.003	0.000	0.001	0.000	0.022	0.000
	5	0.001	0.080	0.001	0.013	0.000	0.002	0.002	0.000	0.000	0.001	0.002	0.003	0.003	0.038	-0.002	0.000	0.000	0.000	0.009	0.001
12/7/2001	1	0.000	0.011	0.003	0.015	0.001	0.006	0.004	0.000	0.000	0.000	0.003	0.004	0.005	0.102	0.005	0.000	0.000	0.000	0.016	0.000
	2	0.000	0.010	0.002	0.011	0.001	0.007	0.003	0.000	0.000	0.000	-0.001	0.002	0.003	0.059	-0.002	0.000	0.000	0.000	0.008	0.000
	3	0.000	0.011	0.002	0.012	0.000	0.005	0.004	0.000	0.000	0.000	0.002	0.002	0.005	0.073	0.007	0.000	0.000	0.000	0.017	0.000
	4	0.001	0.012	0.002	0.009	0.002	0.011	0.004	0.000	0.000	0.001	-0.001	0.002	0.007	0.068	-0.001	0.000	0.001	0.000	0.012	0.000
	5	0.000	0.078	0.001	0.012	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.011	-0.003	0.000	0.001	0.000	0.010	0.000
12/10/2001	1	0.000	0.018	0.001	0.007	0.000	0.002	0.001	0.000	0.001	0.000	0.000	0.000	0.001	0.028	0.000	0.000	0.000	0.000	0.006	0.000
	3	0.000	0.014	0.001	0.008	0.000	0.002	0.002	0.000	0.001	0.000	0.001	0.000	0.000	0.039	0.009	0.000	0.000	0.000	0.009	0.000
	4	0.001	0.012	0.002	0.009	0.002	0.012	0.005	0.000	0.000	0.001	0.001	0.006	0.001	0.063	0.009	0.000	0.001	0.000	0.011	0.000
	5	0.000	0.031	0.000	0.004	0.000	0.000	0.001	0.001	0.000	0.000	-0.001	0.000	0.001	0.000	0.003	0.000	0.000	0.000	0.003	0.000
12/11/2001	1	0.001	0.015	0.001	0.010	0.000	0.004	0.002	0.000	0.000	0.000	-0.001	0.000	0.000	0.076	-0.003	0.000	0.000	0.000	0.015	0.000
	2	0.000	0.007	0.001	0.004	0.000	0.002	0.001	0.000	0.000	0.000	-0.001	0.000	0.000	0.042	-0.001	0.000	0.000	0.000	0.005	0.000
	3	0.000	0.007	0.001	0.014	0.000	0.003	0.001	0.000	0.000	0.000	-0.001	0.000	0.000	0.097	0.004	0.000	0.000	0.000	0.007	0.000
	4	0.001	0.016	0.004	0.031	0.001	0.011	0.006	0.000	0.001	0.001	0.001	0.006	0.007	0.123	0.006	0.000	0.001	0.000	0.075	0.000
	5	0.001	0.161	0.001	0.021	0.000	0.002	0.002	0.000	0.000	0.000	-0.001	0.003	0.000	0.000	-0.003	0.000	0.000	0.000	0.027	0.001
12/12/2001	2	0.001	0.021	0.004	0.029	0.001	0.011	0.005	0.000	0.001	0.004	0.001	0.008	0.016	0.242	0.017	0.000	0.000	0.000	0.115	0.000
	3	0.000	0.007	0.001	0.006	0.000	0.001	0.001	0.000	0.000	0.000	0.002	0.000	0.000	0.086	-0.003	0.000	0.000	0.000	0.022	0.000
	4	0.001	0.017	0.005	0.028	0.002	0.021	0.010	0.000	0.001	0.000	-0.001	0.007	0.013	0.185	-0.003	0.000	0.002	0.001	0.067	0.001
	5	0.000	0.118	0.001	0.017	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.008	-0.003	0.000	0.000	0.000	0.027	0.000
12/13/2001	1	0.001	0.011	0.002	0.011	0.000	0.006	0.003	0.000	0.000	0.000	-0.001	0.001	0.007	0.087	-0.003	0.000	0.001	0.000	0.047	0.000
	2	0.000	0.006	0.001	0.005	0.000	0.002	0.001	0.000	0.000	0.001	0.001	0.000	0.003	0.027	-0.003	0.000	0.000	0.000	0.011	0.000
	3	0.000	0.006	0.001	0.009	0.000	0.004	0.002	0.000	0.001	0.001	0.000	0.003	0.005	0.052	-0.003	0.000	0.000	0.000	0.030	0.000
	4	0.000	0.008	0.003	0.015	0.001	0.014	0.006	0.000	0.003	0.001	0.001	0.003	0.002	0.087	0.022	0.000	0.001	0.000	0.037	0.001
12/17/2001	2	0.000	0.005	0.001	0.006	0.000	0.003	0.002	0.002	0.000	0.000	0.001	0.002	0.004	0.034	-0.002	0.000	0.000	0.000	0.007	0.000
	3	0.001	0.009	0.003	0.018	0.001	0.008	0.005	0.000	0.000	0.000	-0.001	0.006	0.006	0.131	-0.003	0.000	0.000	0.000	0.021	0.001
	4	0.000	0.004	0.002	0.008	0.001	0.006	0.005	0.001	0.000	0.002	0.002	0.000	0.002	0.043	-0.003	0.000	0.001	0.000	0.018	0.000
	5	0.001	0.044	0.000	0.007	0.000	0.001	0.001	0.000	0.000	0.000	-0.001	0.000	0.000	0.008	-0.003	0.000	0.000	0.000	0.003	0.000
12/18/2001	2	0.000	0.009	0.001	0.008	0.000	0.003	0.002	0.002	0.000	0.000	0.001	0.003	0.002	0.043	-0.003	0.000	0.000	0.000	0.007	0.000
	3	0.000	0.008	0.002	0.012	0.001	0.007	0.003	0.000	0.000	0.000	-0.001	0.005	0.003	0.092	-0.001	0.000	0.001	0.000	0.011	0.000
	4	0.000	0.009	0.001	0.010	0.000	0.005	0.002	0.000	0.001	0.002	0.001	0.012	0.006	0.031	0.002	0.000	0.001	0.000	0.069	0.000
	5	0.000	0.052	0.000	0.007	0.000	0.001	0.000	0.000	0.000	0.000	-0.001	0.000	-0.001	0.001	0.009	0.000	0.000	0.000	0.001	0.000
12/19/2001	2	0.001	0.009	0.001	0.009	0.000	0.004	0.002	0.001	0.000	0.000	0.003	0.006	0.006	0.058	-0.003	0.000	0.001	0.000	0.011	0.000
	3	0.001	0.013	0.002	0.015	0.000	0.008	0.004	0.001	0.002	0.000	0.000	0.007	0.008	0.075	-0.003	0.000	0.001	0.000	0.053	0.001
	4	0.000	0.012	0.001	0.007	0.000	0.005	0.003	0.000	0.002	0.000	0.002	0.002	0.010	0.038	-0.003	0.000	0.000	0.000	0.025	0.000
	5	0.001	0.085	0.001	0.014	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.032	-0.002	0.000	0.001	0.000	0.004	0.000
12/20/2001	1	0.000	0.019	0.000	0.006	0.000	0.002	0.001	0.000	0.002	0.001	0.002	0.000	0.000	0.018	-0.003	0.000	0.000	0.000	0.004	0.000
	2	0.000	0.005	0.001	0.005	0.000	0.002	0.001	0.000	0.000	0.000	0.002	0.000	0.000	0.070	-0.003	0.000	0.000	0.000	0.005	0.000
	3	0.000	0.006	0.001	0.007	0.001	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.040	-0.003	0.000	0.000	0.000	0.017	0.000
	4	0.001	0.008	0.003	0.012	0.001	0.011	0.006	0.000	0.000	0.000	-0.001	0.005	0.004	0.046	-0.003	0.000	0.001	0.000	0.028	0.000
1/16/2002	1	0.001	0.011	0.001	0.006	0.000	0.002	0.001	0.000	0.000	0.001	0.002	0.001	0.003	0.032	-0.003	0.000	0.000	0.000	0.007	0.000
	2	0.001	0.010	0.001	0.005	0.000	0.003	0.001	0.000	-0.001	0.000	0.000	0.000	0.001	0.039	0.012	0.000	0.000	0.000	0.006	0.000
	3	0.001	0.011	0.002	0.009	0.000	0.003	0.002	0.001	-0.001	-0.001	0.001	0.005	-0.001	0.057	-0.005	0.000	0.000	0.000	0.015	0.001
	4	0.001	0.005	0.002	0.007	0.001	0.004	0.006	0.000	0.001	0.000	-0.001	0.003	-0.001	0.039	0.015	0.000	0.000	0.000	0.004	0.000
	5	0.001	0.052	0.000	0.008	0.000	0.001	0.000	0.000	-0.001	0.000	-0.001	0.000	0.000	0.008	-0.003	0.000	0.000	0.000	0.001	0.000
1/17/2002	1	0.000	0.012	0.002	0.011	0.000	0.004	0.002	0.000	-0.001	0.001	-0.001	0.000	0.006	0.044	-0.001	0.000	0.001	0.000	0.023	0.000
	2	0.000	0.017	0.004	0.019	0.001	0.010	0.005	0.002	0.002	0.001	0.003	-0.001	-0.001	0.127	0.023	0.000	0.000	0.000	0.019	0.000
	3	0.001	0.013	0.003	0.024	0.001	0.008	0.004	0.000	0.000	-0.001	0.000	0.000	0.002	0.112	-0.005	0.000	0.001	0.000	0.026	0.001
	4	0.001	0.013	0.006	0.022	0.002	0.011	0.010	0.002	-0.001	0.000	-0.001	0.002	0.003	0.109	0.019	0.000	0.001	0.000	0.022	0.001
	5	0.001	0.115	0.001	0.019	0.001	0.002	0.002	0.000	-0.001	0.000	-0.001	0.000	0.000	0.024	0.022	0.000	0.000	0.000	0.001	0.001

APPENDIX D
HEXAVALENT CHROMIUM VALID DATA

			Total	Total Cr
		Cr+6	Cr Conc	Uncert
Date	Site	ng/m3	ng/m3	ng/m3
12/4/2001	1	0.20	3.01	1.03
	2	0.37	4.99	0.75
	3	0.20	3.36	0.83
	4	0.44	5.32	0.99
	5	0.11	2.16	0.43
12/7/2001	1	0.18	4.04	1.25
	2	0.21	4.55	0.82
	3	0.20	2.87	3.79
	5	<0.07	0.80	1.03
12/10/2001	1	0.12	2.83	0.45
	2	1.27	ND	ND
	3	0.18	1.42	2.28
	4	<0.07	1.08	5.89
	5	<0.06	0.41	0.67
12/16/2001	1	0.11	3.61	0.60
	2	0.09	0.31	1.13
	3	0.12	1.56	0.47
	4	0.40	3.66	5.47
	5	>0.16	12.74	0.49
12/19/2001	2	0.48	0.68	1.67
	3	0.22	3.70	0.48
	4	<0.06	7.30	7.73
	5	0.22	0.58	1.00
12/13/2001	1	0.37	3.72	0.89
	2	0.12	1.02	1.24
	3	0.15	3.59	0.75
	4	0.07	0.95	5.14
12/19/2001	1	0.09	ND	ND
	3	0.23	ND	ND
	4	0.09	ND	ND
	5	<0.06	ND	ND
12/17/2001	1	0.18	-0.85	0.64
	2	0.09	4.52	0.51
	3	0.34	4.68	1.19
	4	<0.06	2.18	3.98
12/10/2001	1	0.00	0.14	0.65
	2	0.21	2.85	0.54
	3	0.20	2.63	2.70
	5	0.12	0.00	1.05
12/15/2001	1	0.07	-0.85	0.61
	2	0.33	1.98	2.20
	3	0.44	5.37	1.19
	4	<0.06	1.48	2.55
	5	0.11	1.59	0.39
12/28/2001	1	0.09	0.89	0.35
	2	0.12	0.89	1.19
	3	0.33	2.85	0.53
	4	0.40	3.99	4.99
	5	0.15	ND	ND
12/21/2001	1	0.23	ND	ND
	2	0.14	ND	ND
	4	0.28	ND	ND
	5	<0.06	ND	ND
1/8/2002	1	0.07	1.72	0.49
	2	0.06	1.93	2.20
	3	0.15	1.68	3.82
	4	0.14	-0.85	4.51
	5	<0.06	0.24	0.91
1/17/2002	1	0.18	5.36	0.84
	2	0.22	10.89	1.68
	3	0.25	17.44	1.58
	4	0.18	10.85	2.74
	5	0.07	0.89	2.24

APPENDIX E
PM_{10} ORGANIC AND ELEME NTAL CARBON VALID DATA

		OC	EC
Date	Site	ug/m3	ug/m3
12/6/2001	1	12.88	4.87
	2	9.30	3.36
	3	8.78	2.96
	4	9.31	2.83
	5	7.87	2.88
12/7/2001	1	12.28	4.40
	2	9.47	2.41
	3	9.95	3.60
	5	10.85	0.67
12/10/2001	1	4.68	1.09
	2	3.87	0.37
	3	9.10	3.98
	4	5.29	0.43
	5	3.99	0.19
12/11/2001	1	7.43	2.06
	2	5.42	1.20
	3	4.03	1.28
	5	8.91	2.16
12/12/2001	2	58.09	17.90
	3	5.06	1.41
	4	33.34	11.17
	5	3.39	0.32
12/13/2001	1	12.51	5.50
	2	5.97	1.57
	3	9.57	1.61
12/17/2001	1	8.72	3.06
	2	7.19	2.15
	3	28.31	8.21
	4	7.96	2.81
	5	4.55	1.05
12/18/2001	1	3.88	1.39
	2	8.69	2.51
	3	8.52	3.76
	4	7.19	2.09
	5	4.77	1.51
12/19/2001	1	8.20	2.85
	2	11.80	3.45
	3	28.93	6.23
	4	6.69	2.36
	5	8.87	2.04
12/20/2001	1	3.46	1.07
	2	5.18	2.04
	3	6.47	2.34
	4	6.13	3.33
	5	2.15	0.77
1/16/2001	2	6.90	1.17
	3	7.53	1.97
	4	4.95	1.38
1/17/2002	1	7.61	2.20
	2	22.95	5.73
	3	9.18	2.94
	4	10.25	3.53

APPENDIX F
VALID HYDROCARBONS VOC MEASURED BY FID (ppbC)

Date	Site	ethane	ethene	acetylene	1-butene	iso-butene	propene	propane	F 12	chloro-methane	isobutane	F 114	acetaldehyde	1,3-butadiene	n-butane	methanol	t-2-butene
12/6/2001	1	12.3	14.33	13.41	1.04	5.11	5.89	15.32	0.22	0.7	7.82	0	3.1	0.94	15.33	2.09	0.56
12/6/2001	2	17.07	23.56	23.83	1.69	7.75	10.32	22.72	0.22	0.84	10.56	0	2.23	2.08	18.27	0.26	0.99
12/6/2001	3	9.62	11.25	9.45	0.82	3.72	5.06	23.49	0.2	0.74	8.58	0	2.41	0.92	18.57	0.36	0.61
12/6/2001	4	9.84	10.29	8.53	0.79	3.45	4.32	14.05	0.23	0.76	7.93	0	3.53	0.68	16.44	12.9	0.51
12/7/2001	1	11.03	18.82	13.19	1.54	6.72	8.14	20.73	0.23	0.9	14.28	0	5.47	1.69	30.72	213.16	0.94
12/7/2001	2	10.84	11.05	8.41	1.25	4.53	5.23	25.11	0.21	0.85	21.27	0	5.4	0.88	30.67	0.31	0.77
12/7/2001	3	11.85	20.39	16.98	2.1	6.68	9.59	30.81	0.22	0.84	26.31	0	3.82	1.75	50.31	0.09	1.52
12/7/2001	4	7.2	5.35	4.28	0.26	0.65	1.61	7.96	0.17	0.72	2.28	0	3.01	0.23	5.12	0.07	0.07
12/7/2001	5	7.16	5.39	4.94	0.43	1.25	2.11	9.71	0.16	0.67	3.31	0	2.81	0.23	7.74	0.45	0.18
12/10/2001	1	7.09	6.96	7.06	0.47	2.47	2.9	10.12	0.16	0.77	3.84	0	2.49	0.47	8.25	0.09	0.29
12/10/2001	2	8.95	9.45	9.42	0.72	2.97	3.86	15.31	0.22	0.76	5.48	0	3.25	0.68	14.25	0.24	0.32
12/10/2001	3	6.22	6.09	5.31	0.5	1.74	2.86	20.51	0.19	0.77	4.46	0	2.69	0.42	10.56	0.12	0.25
12/10/2001	4	5.03	2.59	4.01	0.17	0.3	0.86	7.64	0.15	0.68	1.22	0	2.14	0.1	3.35	0.09	0.02
12/10/2001	5	5.01	1.38	1.44	0.14	0.57	0.63	3.78	0.13	0.71	1.03	0	3.67	0.05	2.08	0.29	0.08
12/11/2001	1	7.3	4.79	3.98	0.24	1.17	1.62	7.57	0.24	0.71	2.78	0	3.5	0.24	6.03	0.1	0.13
12/11/2001	2	6.36	3.13	2.95	0.22	1.08	1.09	6.27	0.16	0.72	2.7	0	4.08	0.15	6.63	0.16	0.14
12/11/2001	3	8.31	8.79	9.16	0.81	2.98	3.71	18.15	0.2	0.75	15.69	0	2.64	0.57	32.27	0.55	0.84
12/11/2001	4	7.64	6.28	5.56	0.5	2.05	2.81	9.36	0.17	0.8	4.85	0	2.34	0.48	9.95	0.21	0.27
12/11/2001	5	6.59	3.39	3.95	0.29	0.79	1.42	12.85	0.18	0.69	2.77	0	2.34	0.13	6.01	0.16	0.12
12/12/2001	1	7.14	7.25	7.28	0.48	1.66	2.95	18.89	0.22	0.76	4.54	0	4.54	0.49	9.72	5.28	0.25
12/12/2001	2	6.41	3.46	3.54	0.23	0.69	1.38	9.86	0.15	0.74	3.33	0	3.56	0.16	6.67	0.14	0.12
12/12/2001	3	7.99	9.48	7.91	0.69	3.04	4.27	30.1	0.2	0.74	5.95	0	3.06	0.72	13.73	0.19	0.48
12/12/2001	4	5.79	2.45	2.44	0.2	0.67	0.9	6.4	0.18	0.74	1.41	0	2.03	0.15	3.43	0.14	0.08
12/13/2001	1	6.44	5.11	5.49	0.28	0.97	1.82	17.72	0.22	0.72	3.94	0	2.11	0.22	8.76	0.24	0.14
12/13/2001	2	6.23	4.95	5.23	0.3	0.98	2.4	17.35	0.19	0.73	4.34	0	3.47	0.21	9.42	16.22	0.14
12/13/2001	3	6.63	7.92	6.8	0.78	2.43	3.22	15.67	0.1	0.46	14.9	0	2.07	0.49	28.55	0.55	0.59
12/13/2001	4	15.3	21.82	21.48	1.57	7.17	8.83	30.93	0.18	0.68	10.63	0	4.11	1.56	24	0.55	0.99
12/13/2001	5	15.89	9.02	8.22	0.47	1.49	3.03	22	0.27	0.96	9.69	0	3.24	0.5	16.75	0.22	0.19
12/17/2001	1	23.62	32.34	29.4	2.41	10.25	14.03	31.06	0.2	0.82	20.59	0	3.75	2.42	41.45	6.14	1.22
12/17/2001	2	23.31	30.5	31.41	2.04	8.87	12.5	33.68	0.25	0.73	17.04	0	2.71	2.13	35.37	0.41	1.24
12/17/2001	3	16.83	18.69	15.49	1.43	5.22	8.02	50.36	0.16	0.77	15.18	0.03	6.07	1.25	28.38	1.48	0.68
12/17/2001	4	15.83	14.03	12.5	0.55	3.93	5.39	20.86	0.18	0.76	71.29	0	4.31	0.81	26.15	0.6	0.57
12/17/2001	5	13.71	5.94	5.37	0.39	1.41	2.01	16.76	0.17	0.72	7.11	0	3.66	0.19	12.31	0.36	0.13
12/18/2001	1	16.4	19.78	18.94	1.25	6.45	7.8	22.74	0.2	0.77	10.79	0	2.68	1.24	23.39	0.03	0.76
12/18/2001	2	16.79	14.69	13.44	0.97	3.08	5.49	28.68	0.18	0.76	12.54	0	4.07	0.64	24.53	0.21	0.33
12/18/2001	3	18.62	19.61	16.86	1.45	5.25	8.12	47.13	0.2	0.76	19.65	0	4.79	1.24	32.29	0.16	0.79
12/18/2001	4	12.23	9.76	8.36	0.68	2.72	3.82	18.28	0.19	0.7	10.66	0	2.96	0.51	16.57	0.36	0.29
12/18/2001	5	15.63	8.2	7.15	0.47	1.46	2.78	19.79	0.17	0.67	9.05	0	3.94	0.3	16.02	0.24	0.15
12/19/2001	1	14.33	10.28	9.38	0.85	3.92	3.8	17.97	0.19	0.63	11.51	0	3.05	0.45	25.38	0.07	0.53
12/19/2001	2	19.01	19.72	18.48	1.36	6.12	7.88	23.43	0.18	0.72	12.94	0	2.69	1.24	26.16	0.4	0.67
12/19/2001	3	22.34	24.98	22.43	1.77	6.32	10.36	86.98	0.25	0.82	20.24	0	5.36	1.37	42.24	0.34	0.87
12/19/2001	4	17.53	18.51	18.75	1.08	5.46	6.91	23.16	0.23	0.7	11.29	0	2.28	1.04	23.81	0.05	0.55
12/20/2001	1	14.96	14.99	13.96	0.95	3.95	5.75	20.23	0.2	0.74	9.74	0	2.64	0.89	21.7	0.19	0.49
12/20/2001	2	15.8	14.12	12.16	0.89	3.4	5.46	22.33	0.19	0.74	10.68	0	3.53	0.75	22.75	0.05	0.48
12/20/2001	3	12.82	12.51	1.6	1.02	3.45	5.27	50.88	0.18	0.76	15	0	3.65	0.71	33.36	0.66	1.01
12/20/2001	4	13.58	12.56	10.82	1.04	3.24	4.96	23.29	0.19	0.88	8.3	0	10.74	0.69	18.65	0.21	0.4
12/20/2001	5	9.09	4.46	4.09	0.37	1.8	1.85	11.66	0.15	0.67	3.95	0	2.4	0.25	7.88	0.07	0.34
12/21/2001	3	7.87	9.06	7.6	0.68	3.16	4.1	19.07	0.13	0.67	6.3	0	3.8	0.67	14.49	0.03	0.49
1/16/2002	1	8.31	4.78	5.1	0.35	1.56	2.2	14.89	0.18	0.7	4.86	0	2.93	0.37	9.79	4.52	0.22
1/16/2002	2	12.65	8.11	9.24	0.74	2.95	4.42	27.67	0.17	0.71	20.29	0	4.08	0.6	33.8	3.19	0.53
1/16/2002	3	8.53	6.24	6.13	0.58	1.9	2.73	22.77	0.17	0.64	5.68	0	3.3	0.42	13.3	1.36	0.36
1/16/2002	4	7.8	4.15	5.39	0.31	0.66	1.66	14.77	0.17	0.67	4.08	0	3.9	0.27	5.84	1.29	1.31
1/16/2002	5	7.45	1.59	1.92	0.34	0.81	1.16	6.51	0.19	0.62	1.55	0	3.29	0.04	3.42	0.33	0.36
1/17/2002	1	9.9	8.9	8.98	0.65	2.99	3.52	12.39	0.16	0.72	7.47	0	5.16	0.53	17.3	0.09	0.42
1/17/2002	2	9.1	4.11	4.69	0.32	1.79	1.84	14.91	0.18	0.68	8.18	0	6.37	0.25	16.28	0.19	0.24
1/17/2002	3	11.15	12.79	11.73	1.02	4.11	5.27	23.86	0.18	0.68	9.03	0	3.28	0.83	21.15	0.03	0.62
1/17/2002	4	10.47	10.99	11.49	0.96	3.77	4.63	15.74	0.19	0.68	9.54	0	2.87	0.73	20.12	0.1	0.57
1/17/2002	5	7.43	2.57	2.54	0.39	1.03	1.26	6.02	0.19	0.64	2.63	0	5.86	0.1	4.16	0.48	0.1

APPENDIX F, CONTINUED
VALID HYDROCARBONS VOC MEASURED BY FID (ppbC)

Date	Site	1&2-butyne	c-2-butene	F 21	3-methyl-1-butene	ethanol	acetonitrile	propanal +F11	isopentane	acetone	1-pentene	2-methyl-1-butene	n-pentane	2-propanol	isoprene	t-2-pentene
12/6/2001	1	0	0.53	0	0.21	0.83	0	0.05	17.91	0.62	0.55	0.61	7.93	1.71	0.52	0.59
12/6/2001	2	0	0.81	0	0.35	0.63	0	0.43	26.45	3.31	0.76	1.19	11.36	0	2.39	1.14
12/6/2001	3	0	0.54	0	0.25	0.8	0	0.44	21.22	7.51	0.54	0.83	8.63	0.17	0.56	0.82
12/6/2001	4	0	0.5	0	0.19	0.71	0	0.02	16.31	0.58	0.53	0.55	9.35	1.24	0.43	0.52
12/7/2001	1	0	1.12	0	0.44	8.24	0	0.8	35.59	12.62	1.08	1.35	13.8	1.62	2.48	1.34
12/7/2001	2	0	0.78	0	0.29	1.17	0	0.04	25.02	1.37	0.85	0.96	12.13	0.16	1.42	1.03
12/7/2001	3	0	1.58	0	0.63	1.07	0	0.09	56.26	0.74	1.53	2.17	21.73	0.91	1.55	2.39
12/7/2001	4	0	0.1	0	0.06	0.07	0	0.13	4.81	0.5	0.16	0.18	2.23	0.19	0.64	0.13
12/7/2001	5	0	0.15	0	0.06	0.14	0	0.05	7.63	0.6	0.25	0.19	3.36	3.17	0.15	0.13
12/10/2001	1	0	0.26	0	0.11	0.61	0	0.59	9.14	4.44	0.26	0.33	3.71	0	0.27	0.32
12/10/2001	2	0	0.36	0	0.14	0.92	0	0.74	12.92	4.74	0.41	0.47	5.84	0	0.43	0.44
12/10/2001	3	0	0.28	0	0.13	0.66	0	0	10.36	0.58	0.3	0.35	4.11	0.34	0.36	0.37
12/10/2001	4	0	0.03	0	0.03	0.29	0	0	2.45	0.42	0.03	0.07	1.23	0.16	0.04	0.02
12/10/2001	5	0	0.08	0	0.03	0.88	0	0.68	1.74	3.88	0.08	0.06	0.99	0.14	0.03	0.03
12/11/2001	1	0	0.12	0	0.06	0.63	0	0.09	6.87	0.81	0.2	0.16	2.98	0.54	0.26	0.15
12/11/2001	2	0	0.11	0	0.07	0.12	0	0.07	7.88	0.41	0.25	0.24	3.54	0.9	0.29	0.27
12/11/2001	3	0	0.78	0	0.27	3.63	0	0.46	27.87	6.24	0.67	0.96	9.7	1.05	0.29	0.9
12/11/2001	4	0	0.24	0	0.12	0.15	0	0	10.69	0.29	0.33	0.44	4.84	0.61	0.23	0.33
12/11/2001	5	0	0.09	0	0.06	0.08	0	0.03	5.07	0.59	0.2	0.26	3	0	0.08	0.1
12/12/2001	1	0	0.24	0	0.13	7.76	0	0.77	10.4	10.29	0.33	0.37	5.15	1.29	0.25	0.29
12/12/2001	2	0	0.1	0	0.05	0.15	0	0.24	7	0.46	0.16	0.16	2.86	1.07	0.6	0.14
12/12/2001	3	0	0.45	0	0.19	0.86	0	0.04	15.94	0.63	0.08	0.58	9.8	1.48	0.67	0.59
12/12/2001	4	0	0.08	0	0	0.31	0	0.03	3.23	0.42	0.12	0.19	2.71	0	0.1	0.09
12/13/2001	1	0	0.16	0	0.07	0.73	0	0.71	8.13	0.51	0.28	0.23	4.08	0.15	0.21	0.19
12/13/2001	2	0	0.11	0	0.08	0	0	0	8.21	174.85	0.31	0.19	3.7	0.68	0.75	0.15
12/13/2001	3	0	0.6	0	0.2	0.34	0	0.46	17.85	4.49	0.37	0.47	15.67	0.13	0.29	0.42
12/13/2001	4	0	0.73	0	0.34	2.2	0	1.52	26.65	8.47	0.73	0.99	11.55	0.24	0.98	1.25
12/13/2001	5	0	0.21	0	0.13	0.73	0	0.06	19.05	0.81	0.56	0.32	8.23	0.81	0.2	0.3
12/17/2001	1	0	1.13	0	0.45	9.53	0	0.57	37.75	12.34	1	1.34	15.22	4.01	0.8	1.09
12/17/2001	2	0	1.53	0	0.43	1.07	0	0.05	36.62	0.58	0.93	1.33	15.1	3.04	0.92	1.32
12/17/2001	3	0	0.68	0	0.26	6.88	0	0.88	27.96	8.11	0.78	0.85	18.01	1.46	0.7	0.82
12/17/2001	4	0	0.5	0	0.23	1.39	0	0.02	130.42	1.19	1.6	0.68	182.1	0.66	0.46	0.72
12/17/2001	5	0	0.12	0	0.08	1.63	0	0.66	9.66	5.32	0.28	0.18	4.26	0.12	0.1	0.31
12/18/2001	1	0	0.63	0	0.24	1.19	0	0.57	25.52	3.71	0.64	0.84	10.25	0.09	0.63	0.78
12/18/2001	2	0	0.36	0	0.2	2.81	0	1.16	21.21	9.11	0.6	0.46	8.84	1.02	0.72	0.4
12/18/2001	3	0	0.71	0	0.3	3.12	0	0.81	35.02	8.1	0.79	0.9	18.75	0.75	0.64	0.77
12/18/2001	4	0	0.27	0	0.13	0.68	0	0.06	20.3	0.63	0.41	0.4	11.82	1.83	0.31	0.4
12/18/2001	5	0	0.13	0	0.11	0.81	0	0.05	14.07	0.81	0.4	0.21	7.95	0.72	0.09	0.17
12/19/2001	1	0	0.52	0	0.22	0.81	0	0.51	22.41	5.25	0.55	0.6	9.18	0.1	0.27	0.61
12/19/2001	2	0	0.87	0	0.29	0.85	0	0.4	27.52	3.81	0.8	0.86	11.78	0	0.78	0.86
12/19/2001	3	0	0.82	0	0.36	0.98	0	1.08	39.87	4.59	1.1	1	27.14	0.03	0.92	0.98
12/19/2001	4	0	0.51	0	0.24	0.73	0	0.62	21.97	1.7	0.22	0.66	9.26	0.03	0.45	0.66
12/20/2001	1	0	0.44	0	0.19	0.73	0	0.04	19.83	0.59	0.56	0.53	8.59	2.43	0.39	0.48
12/20/2001	2	0	0.41	0	0.24	1.05	0	0.07	21.49	0.82	2.35	0.6	8.92	1.18	0.73	0.57
12/20/2001	3	0	0.9	0	0.29	1.07	0	0.06	32.03	0.61	1.02	0.89	13.34	0.88	0.41	0.9
12/20/2001	4	0	0.36	0	0.17	2.15	0	4.81	17.04	3.02	0.63	0.5	7.53	0	0.32	0.49
12/20/2001	5	0	0.18	0	0.06	0.54	0	0.35	6.07	0.48	0.2	0.23	2.64	0.31	0.14	0.18
12/21/2001	3	0	0.43	0	0.15	1.78	0	0.5	13.63	4.4	0.37	0.53	8.67	0.16	0.36	0.65
1/16/2002	1	0	0.25	0	0.07	3.02	0	0.73	8.21	6.06	0.22	0.25	3.62	0.6	0.18	0.22
1/16/2002	2	0	0.35	0	0.21	3.12	0	0.03	18.03	0.83	0.52	0.67	7.52	0.33	0.37	0.68
1/16/2002	3	0	0.31	0	0.1	0.51	0	0.52	11.93	6.95	0.36	0.36	5.74	0.5	0.34	0.47
1/16/2002	4	0	0.12	0	0.08	0.92	0	1.02	6.77	7.35	0.21	0.25	3.07	0.53	0.12	0.42
1/16/2002	5	0	0.09	0	0.06	0.17	0	0.36	2.31	0.76	0.29	0.15	1.17	0.96	0.04	0.05
1/17/2002	1	0	0.42	0	0.15	1.02	0	1	16.34	5.53	0.4	0.48	6.76	0.04	0.32	0.5
1/17/2002	2	0	0.21	0	0.11	1.88	0	1.68	10.47	10.08	0.28	0.35	5.23	2.99	0.43	0.29
1/17/2002	3	0	0.52	0	0.21	0.85	0	0.54	20.98	11.92	0.53	0.66	9.09	1.11	0.53	0.64
1/17/2002	4	0	0.41	0	0.17	0.63	0	0.57	16.55	2.5	0.53	0.56	6.76	0.03	0.34	0.54
1/17/2002	5	0	0.19	0	0.06	0.88	0	0.1	4.22	1.49	0.13	0.17	1.79	2.55	0.04	0.05

APPENDIX F, CONTINUED
VALID HYDROCARBONS VOC MEASURED BY FID (ppbC)

Date	Site	c-2-pentene	2-methyl-2-butene	tert-butanol	F 113	2,2-dimethylbutane	2-methylpropanal	cyclopentene	methacrolein	ethyl-1-pentene	3-methyl-1-pentene	cyclopentane	2,3-dimethylbutane
12/6/2001	1	0.32	0.77	0	0.38	1.62	0	0.17	0	0	0	0.89	2.08
12/6/2001	2	0.63	1.75	0	0.93	2.55	0	0.41	0	0.08	0	1.41	3.22
12/6/2001	3	0.44	1.06	0	0.34	2.06	0	0.25	0	0.05	0	0.96	2.19
12/6/2001	4	0.26	0.78	0	0.43	1.39	0	0.15	0	0	0	0.81	1.7
12/7/2001	1	0.74	1.93	0	1.04	3.12	0	0.37	0	0	0	1.77	3.73
12/7/2001	2	0.51	1.17	0	0.77	2.08	0	0.23	0	0	0	1.06	2.4
12/7/2001	3	1.3	3.03	0	0.75	4.9	0	0.59	0	0	0	2.29	4.82
12/7/2001	4	0.07	0.16	0	0.27	0.41	0	0.04	0	0	0	0.27	0.51
12/7/2001	5	0.07	0.14	0	0.22	0.67	0	0.04	0	0	0	0.38	0.79
12/10/2001	1	0.15	0.35	0	0.27	0.85	0	0.11	0	0.02	0	0.55	1.02
12/10/2001	2	0.29	0.44	0	0.36	1.36	0	0.15	0	0.06	0.02	0.69	1.48
12/10/2001	3	0.21	0.44	0	0.31	0.83	0	0.11	0	0.04	0	0.47	0.99
12/10/2001	4	0.02	0.04	0	0.23	0.22	0	0	0	0	0	0.16	0.26
12/10/2001	5	0.02	0.04	0	0.19	0.12	0	0.02	0	0	0	0.08	0.15
12/11/2001	1	0.08	0.19	0	0.27	0.62	0	0.04	0	0.02	0	0.35	0.75
12/11/2001	2	0.15	0.41	0	0.27	0.89	0	0.08	0	0	0	0.44	0.93
12/11/2001	3	0.57	1.35	0	0.35	2.2	0	0.25	0	0	0	1.08	2.36
12/11/2001	4	0.21	0.49	0	0.35	0.98	0	0.1	0	0	0	0.59	1.17
12/11/2001	5	0.08	0.11	0	0.21	0.41	0	0.02	0	0	0	0.3	0.54
12/12/2001	1	0.18	0.38	0	0.24	0.96	0	0.08	0	0.03	0	0.7	1.19
12/12/2001	2	0.09	0.2	0	0.26	0.47	0	0.05	0	0	0	0.31	0.62
12/12/2001	3	0.31	0.72	0	0.42	1.48	0	0.17	0	0	0	0.79	1.68
12/12/2001	4	0.02	0.12	0	0.27	0.28	0	0.03	0	0	0	0.19	0.33
12/13/2001	1	0.11	0.23	0	0.25	0.75	0	0.04	0	0.01	0	0.47	0.93
12/13/2001	2	0.09	0.31	0	0.24	0.71	0	0.04	139.29	0	0	0.24	0.71
12/13/2001	3	0.26	0.62	0	0.25	1.37	0	0.12	0	0.02	0	0.74	1.33
12/13/2001	4	0.57	1.08	0	0.46	2.74	0	0.34	0	0	0	1.46	3.09
12/13/2001	5	0.14	0.28	0	0.28	1.56	0	0.06	0	0.02	0	0.9	1.82
12/17/2001	1	0.65	1.56	0	0.88	3.65	0	0.39	0	0	0	1.87	3.88
12/17/2001	2	0.73	1.45	0	0.56	3.89	0	0.45	0	0	0	1.79	4.12
12/17/2001	3	0.47	1.04	0	0.44	2.67	0	0.25	0	0	0	1.33	2.76
12/17/2001	4	0.35	1.99	0	0.25	3.24	0	0.21	0	0	0	2.4	2.92
12/17/2001	5	0.05	0.18	0	0.19	0.72	0	0.01	0	0.02	0	0.45	0.85
12/18/2001	1	0.43	1.04	0	0.47	2.57	0	0.22	0	0	0	1.26	2.86
12/18/2001	2	0.22	0.38	0	0.26	2.08	0	0.09	0	0	0	0.98	2.14
12/18/2001	3	0.48	1.02	0	0.38	2.93	0	0.27	0	0	0	1.47	3.02
12/18/2001	4	0.18	0.45	0	0.3	1.49	0	0.1	0	0.02	0	0.79	1.6
12/18/2001	5	0.06	0.05	0	0.17	1.08	0	0.02	0	0.01	0	0.64	1.22
12/19/2001	1	0.3	0.71	0	0.27	2.15	0	0.14	0	0	0	1.02	2.33
12/19/2001	2	0.44	0.94	0	0.35	2.84	0	0.26	0	0.04	0	1.36	3.06
12/19/2001	3	0.51	1.03	0	0.4	3.37	0	0.25	0	0	0	1.72	3.68
12/19/2001	4	0.34	0.71	0	0.46	2.27	0	0.2	0	0.04	0	1.1	2.4
12/20/2001	1	0.26	0.45	0	0.29	1.83	0	0.15	0	0	0	0.97	2.03
12/20/2001	2	0.32	0.54	0	0.31	2	0	0.12	0	0	0	0.99	2.16
12/20/2001	3	0.48	1.13	0	0.37	2.5	0	0.21	0	0.02	0	1.07	2.3
12/20/2001	4	0.24	0.6	0	0.34	1.6	0	0.16	0	0	0	0.81	1.78
12/20/2001	5	0.1	0.13	0	0.2	0.54	0	0.03	0	0	0	0.28	0.61
12/21/2001	3	0.3	0.69	0	0.41	1.35	0	0.16	0	0.04	0	0.57	1.3
1/16/2002	1	0.12	0.29	0	0.4	1.01	0	0.06	0	0	0	0.4	0.91
1/16/2002	2	0.38	0.75	0	0.29	1.65	0	0.13	0	0.03	0	0.7	1.55
1/16/2002	3	0.21	0.5	0	0.42	1.08	0	0.1	0	0.03	0	0.56	1.11
1/16/2002	4	0.12	0.39	0	0.25	0.61	0	0.06	0	0	0	0.39	0.76
1/16/2002	5	0.06	0.06	0	0.19	0.17	0	0.02	0	0	0	0.1	0.2
1/17/2002	1	0.27	0.6	0	0.26	1.5	0	0.1	0	0.02	0	0.78	1.8
1/17/2002	2	0.19	0.42	0	0.23	1	0	0.08	0	0	0	0.45	1.07
1/17/2002	3	0.35	0.87	0	0.51	2.15	0	0.16	0	0.03	0	1.06	2.39
1/17/2002	4	0.31	0.71	0	0.37	1.58	0	0.14	0	0.06	0	0.8	1.8
1/17/2002	5	0.1	0.08	0	0.17	0.24	0	0	0	0.04	0	0.15	0.3

APPENDIX F, CONTINUED
VALID HYDROCARBONS VOC MEASURED BY FID (ppbC)

Date	Site	MTBE	2-methylpentane	butanal	butanone	2,2-dimethylpentane	3-methylpentane	2-methyl-1-pentene	1-hexene	C6 olefin	n-hexane	t-3-hexene + chloroform	c-3-hexene
12/6/2001	1	0.03	4.96	0	0.27	0	4.88	0.55	0.18	0.06	5.05	0	0.13
12/6/2001	2	0.06	15.03	0	0.58	0	6.96	0.56	0.25	0.08	7.41	0	0.23
12/6/2001	3	0.03	5.24	0	0.65	0	5.07	0.19	0.18	0.06	4.02	0	0.09
12/6/2001	4	0	4.02	0	0.5	0	3.74	0.13	0.19	0.06	3.85	0	0.11
12/7/2001	1	0.06	15.39	0	6.16	0	6.76	0.28	0.41	0.04	7.92	0	0.23
12/7/2001	2	0.09	12.49	0	0.23	0	4.98	2	0.25	0.1	13.7	0	0.17
12/7/2001	3	0	12.71	0	6.08	0	8.74	0.4	0.41	0.05	8.7	0	0.35
12/7/2001	4	0.02	3.02	0	0.15	0	1.11	0.02	0.06	0.03	1.12	0	0
12/7/2001	5	0.01	1.87	0	0.3	0	2.17	0.06	0.08	0.02	2.1	0	0.02
12/10/2001	1	0.02	2.42	0	0.67	0	2.63	0.06	0.11	0.03	2.18	0	0.04
12/10/2001	2	0.03	3.51	0	0.84	0	3.62	0.25	0.16	0.04	3.57	0	0.09
12/10/2001	3	0.03	2.82	0	0.31	0	1.93	0.07	0.12	0.02	1.99	0	0.05
12/10/2001	4	0	1.11	0	0.04	0	0.71	0.02	0.01	0.03	1.28	0	0.01
12/10/2001	5	0	0.57	0	0.93	0	0.09	0.02	0.03	0.02	0.93	0	0.01
12/11/2001	1	0.02	4.51	0	0.47	0	1.49	0.01	0.03	0.05	1.75	0	0.02
12/11/2001	2	0.03	2.52	0	0.67	0	2.3	0.05	0.06	0	3.96	0	0.06
12/11/2001	3	0	5.11	0	0.64	0	5.03	0.17	0.15	0.02	3.92	0	0.1
12/11/2001	4	0.03	3.8	0	0.16	0	2.48	0.07	0.1	0.03	2.42	0	0.04
12/11/2001	5	0.01	2.04	0	0.11	0	1.33	0.1	0.08	0.02	1.86	0	0.03
12/12/2001	1	0.03	2.98	0	0.67	0	4.06	0.08	0.13	0.05	3.24	0	0.1
12/12/2001	2	0.03	3.68	0	0.36	0	1.31	0.04	0.03	0.03	1.83	0	0.03
12/12/2001	3	0.05	4.03	0	0.31	0	3.52	0.13	0.17	0.03	3.59	0	0.09
12/12/2001	4	0.02	1.21	0	0.15	0	0.8	0.06	0.09	0	1.32	0	0
12/13/2001	1	0.05	2.61	0	1.98	0	1.77	0.04	0.06	0.03	3.22	0	0.03
12/13/2001	2	0.01	3.48	0	1.94	0	1.59	0.06	0.08	0.03	1.85	0	0.02
12/13/2001	3	0.03	3.24	0	0.56	0	3.12	0.09	0.11	0.04	2.98	0	0.05
12/13/2001	4	0	8.01	0	4.06	0	5.35	0.19	0.37	0.06	5.74	0	0.17
12/13/2001	5	0.01	4.32	0	0.37	0	3.66	0.06	0.14	0.07	4.23	0	0.09
12/17/2001	1	0	10.82	0	3.72	0	7.55	0.24	0.37	0.08	7.21	0	0.2
12/17/2001	2	0	16.63	0	0.45	0	9.23	0.29	0.37	0.07	7.74	0	0.26
12/17/2001	3	0	11.81	0	2.46	0	5.17	0.15	0.33	0.07	5.51	0	0.14
12/17/2001	4	0	8.95	0	0.45	0	7.83	0.12	0.21	0.11	7.93	0	0.2
12/17/2001	5	0.02	1.93	0	0.33	0	2.41	0.01	0.08	0.04	2.12	0	0.02
12/18/2001	1	0	7.37	0	0.54	0	6.19	0.18	0.26	0.05	5.1	0	0.17
12/18/2001	2	0.01	5.39	0	3.57	0	3.61	0.1	0.22	0.06	4.26	0	0.1
12/18/2001	3	0	12.97	0	3.77	0	5.16	0.16	0.33	0.05	5.63	0	0.16
12/18/2001	4	0.05	3.9	0	0.6	0	3.38	0.08	0.13	0.03	3.36	0	0.04
12/18/2001	5	0.02	2.83	0	0.49	0	2.54	0.05	0.12	0.06	2.99	0	0.02
12/19/2001	1	0	10.26	0	0.28	0	5.78	0.14	0.18	0.04	4.54	0	0.08
12/19/2001	2	0.03	13.13	0	0.53	0	6.71	0.52	0.19	0.07	6.56	0	0.2
12/19/2001	3	0	10.21	0	3.73	0	6.86	0.17	0.39	0.06	7.59	0	0.18
12/19/2001	4	0	11.2	0	0.52	0	4.97	0.14	0.21	0.04	4.54	0	0.16
12/20/2001	1	0.02	5.11	0	0.63	0	4.25	0.08	0.16	0.03	4.08	0	0.09
12/20/2001	2	0.05	5.17	0	0.64	0	4.39	0.13	0.21	0.05	3.98	0	0.1
12/20/2001	3	0	5.7	0	0.67	0	5.09	0.15	0.21	0.04	4.18	0	0.16
12/20/2001	4	0.02	7.9	0	0.49	0	4.59	0.09	0.38	0.19	3.8	0	0.1
12/20/2001	5	0.01	1.16	0	0.2	0	1.22	0.05	0.08	0.06	1.42	0	0.01
12/21/2001	3	0.02	3.22	0	0.46	0	3.28	0.11	0.18	0.03	2.97	0	0.08
1/16/2002	1	0.02	2.78	0	0.68	0	2.51	0.05	0.06	0.02	1.64	0	0.02
1/16/2002	2	0.03	8.72	0	0.53	0	3.15	0.41	0.13	0.06	4.85	0	0.17
1/16/2002	3	0.02	2.45	0	0.94	0	3.12	0.07	0.19	0.02	2.42	0	0.04
1/16/2002	4	0.05	4.49	0	0.92	0	2.39	0.08	0.1	0.02	1.58	0	0.1
1/16/2002	5	0.02	0.69	0	0.58	0	0.44	0.05	0.08	0.02	1.49	0	0.01
1/17/2002	1	0.03	9.62	0	1.11	0	4.01	0.1	0.13	0.04	3.52	0	0.12
1/17/2002	2	0.03	6.39	0	0.85	0	3.37	0.74	0.07	0.05	6.76	0	0
1/17/2002	3	0.03	11.57	0	0.88	0	6.34	0.13	0.26	0.04	4.94	0	0.18
1/17/2002	4	0.06	9.95	0	1.09	0	3.7	0.1	0.14	0.02	3.37	0	0.07
1/17/2002	5	0.05	0.99	0	1.14	0	0.65	0.06	0.11	0.05	1.66	0	0

APPENDIX F, CONTINUED
VALID HYDROCARBONS VOC MEASURED BY FID (ppbC)

Date	Site	t-2-hexene	2-methyl-2-pentene	cis-3-methyl-pentene	c-3-hexene	c-2-hexene	3-methyl-2-pentene	methylcyclopentane	2,4-dimethylpentane	mechloroform	2,2,3-trimethylbutane
12/6/2001	1	0.17	0.29	0.11	0.04	0.11	0.2	4.3	1.69	0.02	0.18
12/6/2001	2	0.44	0.65	0.21	0.1	0.19	0.37	6.76	2.67	0	0.26
12/6/2001	3	0.2	0.44	0.13	0.05	0.11	0.21	4.42	1.64	0.02	0.2
12/6/2001	4	0.15	0.24	0.09	0.03	0.05	0.14	3.47	1.31	0.02	0.21
12/7/2001	1	0.45	0.58	0.24	0.13	0.19	0.56	7.42	2.94	0.11	0.29
12/7/2001	2	0.34	0.49	0.27	0.14	0.12	0.23	5.04	1.64	0	0.2
12/7/2001	3	0.58	0.77	0.37	0.15	0.28	0.9	9.54	3.2	0.03	0.31
12/7/2001	4	0.04	0.09	0	0	0.02	0.04	1.01	0.36	0	0.13
12/7/2001	5	0.04	0.11	0.01	0.01	0.04	0.01	1.58	0.57	0	0.12
12/10/2001	1	0.07	0.14	0.04	0.01	0.03	0.09	2.2	0.79	0	0.14
12/10/2001	2	0.14	0.2	0.07	0.03	0.07	0.12	3.11	1.07	0	0.15
12/10/2001	3	0.07	0.17	0.08	0.02	0.05	0.08	1.96	0.7	0	0.14
12/10/2001	4	0	0.01	0	0	0	0	0.56	0.14	0	0.1
12/10/2001	5	0	0.04	0	0	0.02	0	0.38	0.11	0	0.09
12/11/2001	1	0.03	0.11	0.04	0.03	0.03	0.03	1.6	0.58	0	0.14
12/11/2001	2	0.07	0.11	0.06	0	0.06	0.1	2.51	0.62	0	0.12
12/11/2001	3	0.17	0.37	0.13	0.05	0.11	0.22	4.15	1.48	0	0.2
12/11/2001	4	0.07	0.1	0.06	0.02	0.03	0.1	2.62	0.93	0	0.15
12/11/2001	5	0.02	0.08	0.02	0	0.02	0.02	1.03	0.32	0	0.1
12/12/2001	1	0.11	0.2	0.03	0	0.04	0.08	2.4	0.82	0	0.16
12/12/2001	2	0.02	0.17	0	0.01	0.02	0.03	1.16	0.4	0.01	0.12
12/12/2001	3	0.13	0.35	0.09	0.03	0.09	0.14	3.3	1.19	0	0.16
12/12/2001	4	0	0.04	0	0.08	0.04	0.02	0.7	0.24	0	0.11
12/13/2001	1	0.05	0.16	0.01	0	0.04	0.06	1.96	0.58	0	0.13
12/13/2001	2	0.03	0.08	0.02	0.27	0.02	0.06	1.44	0.65	0	0.14
12/13/2001	3	0.12	0.23	0.07	0.02	0.05	0.12	2.93	0.98	0	0.1
12/13/2001	4	0.33	0.38	0.17	0.09	0.16	0.4	6.37	2.44	0	0.22
12/13/2001	5	0.09	0.18	0.03	0.03	0.04	0.06	3.8	1.35	0	0.2
12/17/2001	1	0.41	0.38	0.18	0.18	0.16	0.42	8.26	3	0.06	0.34
12/17/2001	2	0.46	0.55	0.25	0.15	0.23	0.38	8.74	3.08	0	0.28
12/17/2001	3	0.22	0.08	0.12	0.07	0.12	0.3	5.72	2.05	0	0.27
12/17/2001	4	0	0.51	0.19	0.11	0.11	0.16	6.4	1.91	0	0.25
12/17/2001	5	0.03	0.07	0	0	0.02	0.04	1.88	0.6	0	0.15
12/18/2001	1	0.25	0.4	0.16	0.08	0.15	0.24	5.77	2.1	0	0.21
12/18/2001	2	0.13	0.13	0.04	0.14	0.07	0.11	4.44	1.6	0	0.22
12/18/2001	3	0.16	0.36	0.14	0.09	0.12	0.3	6.1	2.09	0	0.24
12/18/2001	4	0.06	0.24	0.03	0.01	0.04	0.09	3.36	1.14	0	0.16
12/18/2001	5	0.04	0.1	0	0.01	0.02	0.02	2.67	0.89	0	0.14
12/19/2001	1	0.19	0.23	0.09	0.04	0.09	0.19	4.73	1.61	0	0.21
12/19/2001	2	0.3	0.37	0.17	0.13	0.15	0.24	6.29	2.18	0	0.22
12/19/2001	3	0.18	0.3	0.13	0.08	0.14	0.34	7.44	2.56	0	0.26
12/19/2001	4	0.2	0.35	0.11	0.07	0.09	0.14	5.02	1.75	0	0.2
12/20/2001	1	0.12	0.18	0.05	0.03	0.07	0.13	4.3	1.44	0	0.18
12/20/2001	2	0.19	0.33	0.1	0.18	0.08	0.12	4.25	1.51	0	0.24
12/20/2001	3	0.19	0.3	0.12	0.04	0.09	0.18	4.35	1.46	0	0.17
12/20/2001	4	0.15	0.21	0.08	0.06	0.08	0.14	3.63	1.27	0	0.19
12/20/2001	5	0.03	0.05	0.02	0	0.02	0.04	1.29	0.42	0	0.14
12/21/2001	3	0.15	0.2	0.09	0.06	0.06	0.14	2.7	0.95	0	0.21
1/16/2002	1	0.03	0.09	0.03	0.01	0.02	0.06	1.65	0.57	0	0.15
1/16/2002	2	0.16	0.23	0.1	0.07	0.08	0.1	2.96	0.97	0	0.14
1/16/2002	3	0.06	0.37	0.06	0.01	0.04	0.11	2.03	0.73	0	0.14
1/16/2002	4	0.08	0.15	0.07	0.03	0.03	0.15	1.58	0.46	0	0.14
1/16/2002	5	0.01	0.04	0	0	0.02	0.01	0.55	0.15	0	0.13
1/17/2002	1	0.14	0.2	0.09	0.06	0.05	0.1	3.61	1.27	0	0.16
1/17/2002	2	0.1	0.17	0.03	0.02	0.03	0.07	2.19	0.48	0	0.16
1/17/2002	3	0.2	0.45	0.12	0.07	0.09	0.22	4.98	1.69	0	0.23
1/17/2002	4	0.15	0.16	0.09	0.07	0.03	0.11	3.58	1.29	0	0.14
1/17/2002	5	0.03	0.03	0.01	0	0.02	0.03	0.72	0.22	0	0.11

APPENDIX F, CONTINUED
VALID HYDROCARBONS VOC MEASURED BY FID (ppbC)

Date	Site	1-methylcyclopentene	benzene	3,3-dimethylpentane	cyclohexane	4-methylhexene	2-methylhexane	2,3-dimethylpentane	cyclohexene	3-methylhexane + pentanal
12/6/2001	1	0.12	6.71	0.23	3.8	0.02	2.88	2.6	0.14	3.29
12/6/2001	2	0.42	11.47	0.41	4.42	0.11	4.78	4.25	0.24	5.43
12/6/2001	3	0.19	6.33	0.27	3.93	0	3.15	2.54	0.15	3.53
12/6/2001	4	0.17	5.61	0.19	16.68	0.02	2.21	2.02	0.12	2.74
12/7/2001	1	0.35	9.6	6.57	3.26	0.13	5.02	4.86	0.26	5.83
12/7/2001	2	0.25	6.19	0.27	8.81	0.09	3.57	2.71	0.16	4.63
12/7/2001	3	0.41	10.96	0.47	6.06	0.09	5.97	5.03	0.3	6.67
12/7/2001	4	0.06	2.37	0.07	0.52	0	0.71	0.58	0.02	0.82
12/7/2001	5	0.04	2.82	0.1	0.74	0.01	1.03	0.94	0.09	1.18
12/10/2001	1	0.09	4.14	0.15	1.08	0.03	1.44	1.28	0.14	1.63
12/10/2001	2	0.04	5.12	0.21	1.83	0.01	2.25	1.82	0.18	2.55
12/10/2001	3	0.09	3.41	0.14	1.46	0.01	1.27	1.16	0.04	1.44
12/10/2001	4	0.03	1.77	0.07	0.78	0	0.35	0.25	0.04	0.4
12/10/2001	5	0.05	1.18	0.02	0.14	0	0.2	0.16	0.03	0.22
12/11/2001	1	0.05	2.89	0.09	0.76	0	1.04	0.93	0.02	1.13
12/11/2001	2	0.13	2.6	0.15	1.12	0	1.41	1	0.09	1.51
12/11/2001	3	0.18	5.18	0.14	2.03	0.03	2.5	2.28	0.15	2.78
12/11/2001	4	0.13	4.04	0.15	1.79	0.04	1.73	1.57	0.14	1.95
12/11/2001	5	0.02	2.53	0.13	0.42	0	0.76	0.51	0.08	0.91
12/12/2001	1	0.07	4.49	0.05	0.95	0.03	1.67	1.33	0.09	2.01
12/12/2001	2	0.05	2.52	0.1	0.54	0	0.83	0.63	0.08	0.93
12/12/2001	3	0.12	5.62	0.27	9.89	0.03	2.31	1.94	0.13	2.62
12/12/2001	4	0.02	1.85	0.05	6.78	0.02	0.43	0.34	0.08	0.55
12/13/2001	1	0.09	3.6	0.14	0.77	0.02	1.27	0.91	0.08	1.47
12/13/2001	2	0.03	3.45	0	0.48	0	1.11	1.02	0.03	1.51
12/13/2001	3	0.15	4.33	0.15	1.27	0.04	1.95	1.65	0.13	2.28
12/13/2001	4	0.19	9.89	0.29	3.14	0.05	4.37	3.88	0.19	5.09
12/13/2001	5	0.09	6.07	0.22	1.76	0.03	2.31	2.25	0.18	2.61
12/17/2001	1	0.25	13.65	2.78	4.12	0.07	6.58	5.07	0.31	7.26
12/17/2001	2	0.26	13.59	0.61	4.27	0.08	6.09	4.98	0.31	6.79
12/17/2001	3	0.2	22.56	0.25	2.67	0.02	3.83	3.24	0.18	4.39
12/17/2001	4	0.13	7.65	0.6	4.96	0	4.06	3.22	0.23	4.74
12/17/2001	5	0.02	3.02	0.04	0.77	0	1.06	1.02	0.1	1.21
12/18/2001	1	0.24	8.92	0.33	2.83	0.03	4.02	3.38	0.2	4.43
12/18/2001	2	0.09	6.62	0.22	2.42	0.03	2.92	2.63	0.19	3.42
12/18/2001	3	0.16	17.42	0.21	3.08	0.04	4.07	3.49	0.25	4.69
12/18/2001	4	0.08	4.88	0.23	1.72	0.03	2.21	1.9	0.13	2.49
12/18/2001	5	0.05	4.21	0.17	1.19	0	1.59	1.48	0.16	1.79
12/19/2001	1	0.12	5.65	0.23	2.18	0.05	3.08	2.77	0.18	3.48
12/19/2001	2	0.18	9.06	0.43	3.06	0.04	4.29	3.59	0.25	4.73
12/19/2001	3	0.19	19.66	0.41	3.57	0	4.88	4.2	0.31	5.51
12/19/2001	4	0.13	8.14	0.28	2.45	0.01	3.45	2.87	0.21	3.82
12/20/2001	1	0.07	7.16	0.27	2.02	0.04	2.86	2.34	0.16	3.18
12/20/2001	2	0.11	6.42	0.26	2.09	0.04	2.88	2.48	0.17	3.24
12/20/2001	3	0.12	12.43	0.25	2.25	0.02	2.98	2.34	0.16	3.31
12/20/2001	4	0.1	5.76	0.18	1.73	0.01	2.36	2.66	0.16	8.91
12/20/2001	5	0.06	2.4	0.08	0.58	0.01	0.81	0.72	0.08	0.91
12/21/2001	3	0.17	9.35	0.09	1.29	0.03	1.77	1.54	0.09	2.03
1/16/2002	1	0.09	2.92	0.02	0.56	0.03	1.02	0.87	0.05	1.25
1/16/2002	2	0.17	4.35	0.14	1.57	0.03	2.08	1.56	0.16	2.46
1/16/2002	3	0.1	3.71	0.07	0.83	0.02	1.34	1.26	0.09	1.57
1/16/2002	4	0.12	2.24	3.02	0.48	0	0.88	0.89	0.1	1.03
1/16/2002	5	0.05	1.28	0.03	0.19	0	0.23	0.21	0.02	0.26
1/17/2002	1	0.16	4.66	0.24	1.68	0.02	2.41	2.03	0.15	2.66
1/17/2002	2	0.15	2.56	0.15	1.07	0.03	1.11	0.82	0.09	1.35
1/17/2002	3	0.19	5.93	0.24	2.35	0.07	3.23	2.73	0.14	3.76
1/17/2002	4	0.14	5.18	0.19	1.68	0.04	2.41	1.97	0.22	2.74
1/17/2002	5	0.07	1.62	0.06	0.35	0.02	0.42	0.33	0.08	0.48

APPENDIX F, CONTINUED
VALID HYDROCARBONS VOC MEASURED BY FID (ppbC)

Date	Site	C7 olefin	1,3-dimethylcyclopentane	3-ethylpentane	heptene-1	2,2,4-trimethylpentane	C7 olefin	t-3-heptene	n-heptane	C8 olefin	C8 olefin	C8 olefin	2,4,4,-trimethyl-1-pentene	methylcyclohexane
12/6/2001	1	0.26	0.83	1.08	0	4.83	0.03	0.07	2.42	0.07	0.02	0.02	0.32	2.23
12/6/2001	2	0.25	1.42	1.84	0	7.69	0.04	0.09	3.89	0.14	0.05	0.08	0.25	3.91
12/6/2001	3	0.29	0.9	1.14	0	4.91	0.03	0.07	2.5	0.07	0.01	0.03	0.09	2.93
12/6/2001	4	0.44	0.67	0.85	0	4.26	0.02	0.73	2.27	0.06	0.05	0.03	0.15	2.2
12/7/2001	1	0.42	1.53	2	0	8.77	0.09	0.18	4.63	0.13	0.05	0.24	0.2	5.62
12/7/2001	2	0.94	0.97	1.37	0	5.73	0.03	0.11	4.03	0.1	0.03	0.03	0.34	15.89
12/7/2001	3	0.34	1.84	2.29	0	8.45	0.06	0.03	4.75	0.16	0.07	0.09	0.38	7.19
12/7/2001	4	0.18	0.2	0.26	0	1.09	0	0.02	0.67	0.02	0	0	0.03	0.58
12/7/2001	5	0.36	0.3	0.4	0	1.77	0	0.01	0.94	0.02	0	0	0.08	0.84
12/10/2001	1	0.28	0.41	0.53	0	2.27	0	0.02	1.23	0.04	0.02	0.02	0.06	1.03
12/10/2001	2	0.44	0.73	0.88	0	3.25	0.02	0.05	2.03	0.06	0.03	0.02	0.11	3.19
12/10/2001	3	0.34	0.39	0.5	0	1.93	0	0.02	1.1	0.03	0	0.01	0.06	2.61
12/10/2001	4	0	0.09	0.13	0	0.48	0	0.01	0.37	0.02	0.02	0	0.04	0.29
12/10/2001	5	0.5	0.06	0.1	0	0.38	0	0	0.29	0.01	0.02	0	0.02	0.23
12/11/2001	1	0.36	0.32	0.41	0	1.69	0	0.01	0.92	0.01	0	0	0.04	0.8
12/11/2001	2	0.22	0.46	0.57	0	1.61	0.02	0.03	1.15	0.04	0.02	0.02	0.1	1.39
12/11/2001	3	0.24	0.77	0.96	0	3.82	0.02	0.05	1.94	0.07	0.03	0.03	0.11	2.02
12/11/2001	4	0.22	0.56	0.69	0	2.79	0.02	0.02	1.51	0.04	0	0	0.07	1.31
12/11/2001	5	0.3	0.2	0.27	0	0.95	0	0.01	0.76	0.02	0	0	0.07	0.51
12/12/2001	1	0.39	0.47	0.6	0	2.3	0	0.03	1.64	0.03	0.02	0	0.04	1.5
12/12/2001	2	0.29	0.24	0.3	0	1.18	0	0	0.82	0.03	0	0.01	0.09	0.74
12/12/2001	3	0.44	0.65	0.85	0	3.48	0.04	0.02	2.01	0.08	0.02	0.04	0.16	2.57
12/12/2001	4	0.22	0.12	0.15	0	0.67	0	0.02	0.61	0.03	0	0	0.1	0.61
12/13/2001	1	0.26	0.32	0.44	0	1.87	0	0.02	1.24	0.03	0	0	0.04	1.32
12/13/2001	2	0.08	0.28	0.37	0	1.52	0.01	0.02	1.19	0.02	0.01	0.24	0.03	1.29
12/13/2001	3	0.22	0.64	0.81	0	2.99	0.02	0.03	1.83	0.05	0.03	0.01	0.05	2.23
12/13/2001	4	0.23	1.29	1.64	0	7.28	0.05	0.11	3.32	0.1	0.04	0.05	0.13	3.02
12/13/2001	5	0.25	0.76	0.96	0	4.28	0.02	0.02	1.99	0.02	0	0	0.05	1.89
12/17/2001	1	0.24	1.72	2.2	0	8.92	0.08	0.03	4.58	0.11	0.06	0.04	0.17	4.98
12/17/2001	2	0.17	1.85	2.32	0	9.79	0.06	0.14	4.79	0.14	0.04	0.05	0.19	4.62
12/17/2001	3	0.34	1.14	1.46	0	5.95	0.03	0.09	3.11	0.09	0.03	0.03	0.17	3.91
12/17/2001	4	0.37	1	1.4	0	5.13	0.02	0.13	2.87	0.06	0.03	0.03	0.1	2.82
12/17/2001	5	0.35	0.37	0.46	0	1.99	0	0.02	0.99	0	0	0	0.06	0.93
12/18/2001	1	0.14	1.19	1.49	0	6.58	0.03	0.11	3.16	0.09	0.04	0.05	0.13	2.84
12/18/2001	2	0.38	0.94	1.16	0	4.91	0.02	0.06	2.68	0.06	0.02	0.02	0.09	3.33
12/18/2001	3	0.25	1.2	1.51	0	6.17	0.02	0.03	3.25	0.08	0.03	0.04	0.12	3.66
12/18/2001	4	0.27	0.68	0.87	0	3.6	0.02	0.04	1.82	0.02	0	0.02	0.07	1.73
12/18/2001	5	0.46	0.52	0.66	0	2.75	0	0.02	1.41	0.02	0.01	0.02	0.13	1.33
12/19/2001	1	0.15	0.97	1.19	0	4.61	0.02	0.05	2.51	0.06	0.08	0.2	0.11	2.45
12/19/2001	2	0.11	1.33	1.68	0	7.01	0.04	0.03	3.54	0.08	0.03	0.07	0.23	3.69
12/19/2001	3	0.36	1.45	1.83	0	8.03	0.02	0.06	4.04	0.09	0.05	0.04	0.19	5.03
12/19/2001	4	0.17	1.03	1.3	0	5.73	0.03	0.03	2.77	0.06	0.02	0.02	0.09	2.57
12/20/2001	1	0.12	0.85	1.08	0	4.46	0.02	0.03	2.4	0.06	0.03	0.02	0.1	2.06
12/20/2001	2	0.26	0.86	1.1	0	4.9	0	0.02	2.42	0.03	0.01	0.04	0.06	2.68
12/20/2001	3	0.29	0.83	1.08	0	4.12	0.02	0.06	2.39	0.08	0.02	0.02	0.1	2.96
12/20/2001	4	0.87	0.75	0.94	0	4.08	0.02	0.09	2.25	0.06	0.03	0.02	0.05	1.87
12/20/2001	5	0.3	0.23	0.31	0	1.51	0.02	0.03	0.83	0.02	0	0	0.11	0.79
12/21/2001	3	0.37	0.55	0.71	0	2.67	0.05	0.05	1.51	0.05	0.01	0.02	0.12	2.11
1/16/2002	1	0.41	0.31	0.39	0	1.53	0	0.03	0.97	0.03	0	0	0.07	0.79
1/16/2002	2	0.6	0.62	0.82	0	2.88	0	0.03	1.94	0.04	0	0.02	0.25	2.13
1/16/2002	3	0.54	0.35	0.49	0	1.8	0	0.04	1.22	0.05	0.04	0.03	0.19	2.58
1/16/2002	4	0.35	0.27	0.37	0	1.17	0.01	0.02	0.85	0.04	0	0.01	0.09	0.87
1/16/2002	5	0.53	0.06	0.1	0	0.68	0	0.01	0.29	0.02	0	0	0.18	0.18
1/17/2002	1	0.3	0.65	0.85	0	3.05	0	0.03	1.96	0.04	0.01	0.02	0.19	1.77
1/17/2002	2	1.05	0.34	0.48	0	1.49	0	0.03	1.09	0.04	0	0.01	0.13	1.03
1/17/2002	3	0.39	0.9	1.17	0	4.19	0.02	0.06	2.69	0.09	0.03	0.04	0.12	2.97
1/17/2002	4	0.18	0.67	0.86	0	3.07	0.02	0.05	2.01	0.05	0	0.03	0.15	1.67
1/17/2002	5	0.63	0.12	0.19	0	0.59	0	0.02	0.55	0.02	0	0	0.23	0.3

APPENDIX F, CONTINUED
VALID HYDROCARBONS VOC MEASURED BY FID (ppbC)

		C8			C8						C8	
Date	Site	paraffin	2,5-diemthylhexane	2,4-diemthylhexane	paraffin	2,3,4-trimethylpentane	toluene	2,3-dimethylhexane	2-methylheptane	4-methylheptane	paraffin	3-methylheptane
12/6/2001	1	0	0.74	0.16	0.45	1.68	20.65	0.06	1.29	0.94	0.28	1.35
12/6/2001	2	0	1.24	0.24	0.81	2.96	32.48	0.08	2.21	1.1	0.37	2.27
12/6/2001	3	0	0.76	0.13	0.48	1.73	21.22	0.05	1.45	0.54	0.25	1.48
12/6/2001	4	0	0.59	0.13	0.39	1.37	17.64	0.05	1.13	0.5	0.32	1.07
12/7/2001	1	0.05	1.39	0.26	0.92	3.33	33.95	0.09	2.71	0.96	0.54	2.58
12/7/2001	2	0	0.97	0.16	0.54	2.06	24.61	0.08	1.6	2.47	0.28	1.67
12/7/2001	3	0.03	1.36	0.26	0.94	3.08	38.33	0.11	2.71	1.06	0.46	2.78
12/7/2001	4	0	0.16	0.04	0.09	0.36	7.14	0.01	0.32	0.14	0.02	0.33
12/7/2001	5	0	0.27	0.06	0.16	0.6	8.08	0.03	0.48	0.2	0.19	0.51
12/10/2001	1	0	0.34	0.08	0.23	0.79	10.12	0.02	0.66	0.28	0.16	0.7
12/10/2001	2	0	0.53	0.11	0.39	1.13	15.34	0.04	1.03	0.5	0.22	1.07
12/10/2001	3	0	0.3	0.07	0.2	0.67	12.43	0.02	0.58	0.23	0.07	0.59
12/10/2001	4	0	0.08	0.01	0.05	0.13	2.92	0.01	0.14	0.05	0.02	0.14
12/10/2001	5	0	0.04	0.01	0.06	0.11	2.07	0.03	0.15	0.09	0.12	0.11
12/11/2001	1	0	0.25	0.05	0.18	0.58	7.25	0.04	0.48	0.21	0.03	0.51
12/11/2001	2	0	0.28	0.04	0.25	0.62	8.07	0.03	0.68	0.27	0.13	0.73
12/11/2001	3	0	0.56	0.12	0.4	1.3	17.52	0.05	1.15	0.44	0.16	1.13
12/11/2001	4	0	0.44	0.09	0.32	0.98	11.41	0.03	0.86	0.33	0.11	0.81
12/11/2001	5	0	0.14	0.04	0.13	0.3	7.74	0.02	0.35	0.13	0.07	0.35
12/12/2001	1	0	0.38	0.08	0.26	0.77	14.78	0.05	0.84	0.31	0.16	0.78
12/12/2001	2	0	0.17	0.04	0.12	0.39	8.15	0.03	0.38	0.18	0.06	0.39
12/12/2001	3	0	0.55	0.11	0.37	1.19	22.9	0.06	1.09	0.42	0.15	1.11
12/12/2001	4	0	0.12	0.04	0.1	0.24	5.13	0	0.27	0.11	0.02	0.23
12/13/2001	1	0	0.27	0.07	0.19	0.56	11.47	0.03	0.63	0.23	0.13	0.59
12/13/2001	2	0.01	0.41	0.07	0.17	0.46	10.09	0.02	0.54	0.21	0.06	0.45
12/13/2001	3	0	0.47	0.09	0.4	0.98	15.86	0.04	1.04	0.34	0.18	0.94
12/13/2001	4	0	1.13	0.18	0.71	2.49	28.32	0.08	2.04	0.77	0.33	2.09
12/13/2001	5	0	0.59	0.12	0.39	1.41	15.52	0.06	1.08	0.4	0.19	1.03
12/17/2001	1	0.02	1.35	0.24	0.88	2.99	37.07	0.13	2.61	0.96	0.39	2.54
12/17/2001	2	0	1.51	0.34	0.95	3.56	37.48	0.11	2.85	1.14	0.5	2.92
12/17/2001	3	0	0.92	0.23	0.61	2.01	26.7	0.07	1.75	0.65	0.31	1.72
12/17/2001	4	0	0.75	0.18	0.49	1.81	140.16	0.11	1.64	0.6	0.29	1.54
12/17/2001	5	0.02	0.27	0.11	0.19	0.66	7.59	0.01	0.5	0.2	0.1	0.5
12/18/2001	1	0	1	0.17	0.63	2.31	25.23	0.08	1.83	0.7	0.29	1.84
12/18/2001	2	0	0.76	0.18	0.53	1.63	21.13	0.06	1.5	0.54	0.31	1.37
12/18/2001	3	0	0.91	0.21	0.6	2.1	31.95	0.06	1.76	0.68	0.27	1.71
12/18/2001	4	0	0.5	0.12	0.36	1.19	20.18	0.05	0.98	0.38	0.15	0.98
12/18/2001	5	0.02	0.4	0.07	0.29	0.94	13.59	0.04	0.75	0.3	0.11	0.69
12/19/2001	1	0.03	0.7	0.15	0.5	1.53	18.17	0.06	1.37	0.5	0.23	1.32
12/19/2001	2	0	1.07	0.26	0.72	2.46	26.44	0.08	1.97	0.91	0.3	1.96
12/19/2001	3	0	1.16	0.26	0.77	2.7	36.61	0.11	2.3	0.84	0.38	2.23
12/19/2001	4	0	0.87	0.19	0.53	2.03	22.1	0.05	1.6	0.61	0.25	1.61
12/20/2001	1	0	0.68	0.15	0.44	1.53	20.47	0.08	1.31	0.48	0.18	1.28
12/20/2001	2	0	0.72	0.16	0.47	1.66	19.7	0.06	1.34	0.51	0.24	1.32
12/20/2001	3	0	0.67	0.13	0.43	1.44	20.94	0.05	1.26	0.47	0.2	1.23
12/20/2001	4	0	0.58	0.16	0.44	1.39	16.27	0.11	1.17	0.43	0.27	1.15
12/20/2001	5	0	0.22	0.04	0.14	0.48	5.92	0.02	0.36	0.14	0.04	0.36
12/21/2001	3	0	0.42	0.11	0.3	0.93	13.92	0.03	0.79	0.28	0.15	0.8
1/16/2002	1	0	0.22	0.03	0.17	0.53	8.15	0.02	0.48	0.2	0.09	0.52
1/16/2002	2	0	0.44	0.11	0.36	0.89	18.52	0.05	0.88	0.53	0.13	0.87
1/16/2002	3	0	0.32	0.08	0.2	0.65	15.81	0.05	0.73	0.29	0.19	0.67
1/16/2002	4	0	0.18	0.06	0.17	0.43	7.35	0.03	0.43	0.19	0.13	0.41
1/16/2002	5	0	0.06	0.02	0.05	0.13	2	0.01	0.08	0.07	0.08	0.14
1/17/2002	1	0	0.52	0.08	0.33	1.07	14.96	0.06	1.1	0.42	0.19	1.15
1/17/2002	2	0.03	0.25	0.06	0.23	0.52	8.77	0.03	0.46	0.72	0.1	0.47
1/17/2002	3	0	0.73	0.17	0.5	1.48	21.64	0.06	1.44	0.53	0.22	1.46
1/17/2002	4	0	0.52	0.09	0.37	1.07	16.48	0.08	1.11	0.42	0.13	1.12
1/17/2002	5	0	0.08	0.02	0.07	0.19	4.34	0.01	0.18	0.11	0.02	0.25

APPENDIX F, CONTINUED
VALID HYDROCARBONS VOC MEASURED BY FID (ppbC)

Date	Site	hexanal	2,2,5-trimethylhexane	octene-1	1,1-dimethylcyclohexane	n-octane	2,3,5-trimethylhexane +bkgd	2,4-dimethylheptane	C9 olefin	4,4-dimethylheptane	2,6-dimethylheptane
12/6/2001	1	0.75	0.81	0.05	0.26	1.23	7.9	0	0	0	0.02
12/6/2001	2	1.16	1.04	0.02	0.43	1.89	3.98	0	0	0.02	0.02
12/6/2001	3	0.85	0.64	0.06	0.28	1.34	4.08	0.02	0	0.02	0.02
12/6/2001	4	0.62	0.54	0.08	0.25	1.21	20.54	0	0	0.02	0
12/7/2001	1	1.31	1.54	0.13	0.49	2.51	49.53	0	0	0.02	0.03
12/7/2001	2	0.74	0.76	0.31	0.35	2.56	1.41	0.03	0	0	0.04
12/7/2001	3	1.53	1.24	0.13	0.67	2.51	3.97	0.04	0	0.04	0.01
12/7/2001	4	0.59	0.16	0	0.07	0.36	6.46	0	0	0	0.01
12/7/2001	5	0.3	0.3	0.01	0.02	0.54	11.65	0.01	0	0.01	0.01
12/10/2001	1	0.36	0.45	0.05	0.13	0.59	23.91	0	0	0.02	0.02
12/10/2001	2	0.59	0.43	0.11	0.18	1.06	4.97	0	0	0.02	0.01
12/10/2001	3	0.34	0.25	0.07	0.14	0.71	4.95	0	0	0.01	0.02
12/10/2001	4	0.45	0.05	0	0.04	0.16	0.92	0	0	0	0
12/10/2001	5	0.15	0.09	0.01	0.03	0.19	31.58	0.02	0	0.03	0.07
12/11/2001	1	0.63	0.29	0	0.09	0.49	4.09	0	0	0	0
12/11/2001	2	0.58	0.21	0	0.13	0.66	8.78	0.02	0	0	0
12/11/2001	3	0.62	0.53	0.04	0.28	1.08	4.33	0.02	0	0.02	0
12/11/2001	4	0.54	0.34	0.05	0.15	0.89	3.63	0	0	0.01	0
12/11/2001	5	0.16	0.11	0	0.06	0.4	19.44	0	0	0	0.03
12/12/2001	1	0.4	0.37	0.05	0.13	0.8	20.15	0.02	0	0.01	0.05
12/12/2001	2	0.3	0.13	0	0.06	0.57	4.28	0.01	0	0.01	0
12/12/2001	3	0.54	0.48	0.11	0.26	1.17	3.58	0.02	0	0.02	0.02
12/12/2001	4	0.12	0.08	0	0.03	0.4	4.54	0	0	0	0
12/13/2001	1	0.28	0.45	0.04	0.09	0.73	7.95	0	0	0.01	0.01
12/13/2001	2	0	0.34	0.1	0.08	0.61	2.32	0	0	0.01	0.01
12/13/2001	3	0.62	0.42	0	0.19	1.18	3.54	0	0	0.01	0.01
12/13/2001	4	0.86	1.02	0.13	0.39	1.78	4.7	0.04	0	0.03	0.05
12/13/2001	5	0.71	0.62	0.04	0.23	1.06	5.67	0	0	0.01	0.02
12/17/2001	1	1.35	1.25	0.06	0.54	2.29	17.66	0.03	0	0.01	0.03
12/17/2001	2	1.34	1.48	0.14	0.66	2.45	4.06	0.03	0	0.03	0.01
12/17/2001	3	0.8	0.87	0.1	0.39	1.65	2.77	0.03	0	0.02	0.02
12/17/2001	4	1.03	0.84	0.19	0.33	2.08	3.73	0.05	0	0.04	0.03
12/17/2001	5	0.34	0.33	0.04	0.07	0.54	13.88	0	0	0.01	0.01
12/18/2001	1	0.97	0.95	0.06	0.37	1.57	16.65	0.02	0	0.02	0.02
12/18/2001	2	0.69	0.73	0.09	0.27	1.33	3.63	0.04	0	0.02	0.04
12/18/2001	3	0.79	0.89	0.08	0.35	1.66	4.05	0.03	0	0.03	0.03
12/18/2001	4	0.66	0.49	0.04	0.12	1.03	6.76	0	0	0.01	0.02
12/18/2001	5	0.42	0.37	0.08	0.09	0.79	12.41	0	0	0.01	0.02
12/19/2001	1	0.72	0.66	0.04	0.29	1.16	4.07	0.03	0	0.01	0.01
12/19/2001	2	1.01	0.98	0.07	0.37	1.65	4.7	0.05	0	0.04	0.02
12/19/2001	3	1.25	1.2	0.14	0.55	2.24	3.04	0.04	0	0.02	0.02
12/19/2001	4	0.81	0.75	0.05	0.3	1.41	2.41	0.03	0	0.02	0.03
12/20/2001	1	0.73	0.59	0.05	0.25	1.27	5.4	0.02	0	0.01	0
12/20/2001	2	0.63	0.65	0.09	0.24	1.25	3.44	0.02	0	0.03	0.01
12/20/2001	3	0.58	0.62	0.07	0.28	1.31	2.91	0.03	0	0.02	0.02
12/20/2001	4	0.66	0.68	0.44	0.03	1.34	6.7	0.02	0	0.02	0.03
12/20/2001	5	0.31	0.16	0.05	0.05	0.43	3.64	0	0	0.01	0.01
12/21/2001	3	0.31	0.4	0.08	0.21	0.86	2.76	0.01	0	0.02	0.02
1/16/2002	1	0.32	0.26	0.11	0.07	0.53	17.94	0	0	0.01	0.01
1/16/2002	2	0.81	0.33	0.29	0.02	1.13	4.47	0	0	0.02	0.02
1/16/2002	3	0.56	0.3	0.13	0.24	0.93	4.63	0	0	0.01	0.01
1/16/2002	4	0.43	0.23	0.11	0.12	0.52	3.49	0	0	0.01	0
1/16/2002	5	0.18	0.12	0.08	0	0.15	10.19	0	0	0	0
1/17/2002	1	0.77	0.44	0.1	0.17	1.11	6.72	0	0	0.01	0.02
1/17/2002	2	0.39	0.16	0.12	0.08	0.58	3.82	0	0	0	0
1/17/2002	3	0.83	0.75	0.13	0.35	1.58	2.45	0.02	0	0.02	0.02
1/17/2002	4	0.95	0.47	0.07	0.26	1.11	3.39	0	0	0.01	0.02
1/17/2002	5	0.14	0.07	0.05	0.02	0.31	4.92	0	0	0.01	0.01

APPENDIX F, CONTINUED
VALID HYDROCARBONS VOC MEASURED BY FID (ppbC)

Date	Site	chlorobenzene	2,5-dimethylheptane	3,3-dimethylheptane	C9 olefin	ethylbenzene	C9 olefin	m- & p- xylene	2-methyloctane	3-methyloctane	C9 paraffin	styrene+ heptanal	o-xylene
12/6/2001	1	0.63	0.04	0	0	3.36	0.56	13.63	0.1	0.73	0.05	1.53	4.59
12/6/2001	2	0.99	0.08	0	0	5.34	0.74	20.83	0	1.12	0.08	2.46	7.38
12/6/2001	3	0.7	0.05	0	0	3.66	0.45	12.93	0.12	0.77	0.05	1.97	4.76
12/6/2001	4	0.58	0.29	0	0	3.01	0.47	10.56	0.73	0.75	0.07	2.56	4.37
12/7/2001	1	1.34	0.87	0	0	6.54	0.99	24.32	0.11	1.87	0.16	2.37	9.48
12/7/2001	2	0.95	0.05	0.05	0	5.12	1.43	23.87	0.68	1.18	0.18	2.58	7.33
12/7/2001	3	1.2	0.16	0	0	6.31	1.08	23.34	0.45	2.14	0.21	3.37	9.03
12/7/2001	4	0.14	0	0	0	1.11	0.11	3.65	0.04	0.35	0	1.01	1.38
12/7/2001	5	0.18	0	0	0	1.3	0.15	4.33	0.28	0.29	0.02	2.37	1.68
12/10/2001	1	0.28	0.02	0	0	1.72	0.2	6.29	0.09	0.39	0.03	1.06	2.4
12/10/2001	2	0.46	0.05	0	0	2.6	0.34	9.36	0.27	0.6	0.03	2.9	3.46
12/10/2001	3	0.26	0.01	0	0	1.61	0.18	5.97	0.65	0.33	0	0.93	2.28
12/10/2001	4	0.08	0	0	0	0.66	0.07	1.78	0	0.13	0	0.52	0.69
12/10/2001	5	0.06	0.01	0	0	0.36	0.04	0.97	0	0.13	0.02	2.72	0.34
12/11/2001	1	0.18	0	0	0	1.12	0.14	3.73	0.18	0.33	0	0.75	1.42
12/11/2001	2	0.28	0	0	0	1.61	0.19	5.77	0	0.47	0.04	0.96	1.93
12/11/2001	3	0.48	0.04	0	0.02	2.78	0.36	9.89	0.25	0.64	0.05	1.22	3.62
12/11/2001	4	0.4	0.04	0	0	1.99	0.25	6.85	0.11	0.58	0.03	1.43	2.72
12/11/2001	5	0.12	0	0	0	1.29	0.11	3.65	0	0.25	0	2.63	1.46
12/12/2001	1	0.29	0.03	0	0	2.38	0.24	7.43	0.09	0.44	0.03	2.23	2.86
12/12/2001	2	0.16	0	0	0.02	1.25	0.12	3.87	0.1	0.21	0	0.65	1.41
12/12/2001	3	0.44	0.04	0.02	0.02	2.97	0.3	10.17	0.33	0.67	0.04	1.38	3.82
12/12/2001	4	0.13	0.72	0	0	0.74	0.12	2.33	0	0.36	0.03	0.33	1.22
12/13/2001	1	0.32	0	0	0.01	1.91	0.23	5.42	0	0.52	0.04	1.1	2.55
12/13/2001	2	0.18	0.02	0	0.02	1.91	0.16	5.52	0.2	0.36	0	0.52	3.97
12/13/2001	3	0.53	0.03	0	0	2.47	0.42	8.37	0.48	0.72	0.03	0.82	3.09
12/13/2001	4	0.97	0.08	0.09	0.15	4.94	0.55	17.9	0.02	1.2	0.07	2.39	6.72
12/13/2001	5	0.53	0.03	0.01	0	2.55	0.37	8.31	0.02	0.52	0.04	1.56	3.27
12/17/2001	1	1.23	0.3	0	0	6.96	0.78	24.17	0.03	1.53	0.08	3.14	9.29
12/17/2001	2	1.21	0.11	0	0	6.7	0.88	24.66	0.17	1.49	0.11	2.12	9.36
12/17/2001	3	1.42	0.09	0.03	0.02	4.29	0.49	15.43	1.01	1	0.06	1.77	5.73
12/17/2001	4	1.06	0.1	0.01	0.02	4.73	0.97	13.59	0.6	1.24	0.09	3.08	5.37
12/17/2001	5	0.19	0	0	0.01	1.25	0.15	3.94	0.22	0.29	0.03	17.29	1.72
12/18/2001	1	0.88	0.05	0.01	0.06	4.43	0.51	16.04	0.01	0.95	0.07	1.37	6.05
12/18/2001	2	0.67	0.06	0	0	3.4	0.6	11.47	0.48	0.86	0.07	1.76	4.48
12/18/2001	3	1.76	0.35	0.07	0.16	4.41	0.51	15.66	0.61	1	0.07	1.87	6.08
12/18/2001	4	0.5	0.04	0	0	2.66	0.35	8.67	0.19	0.57	0.03	1.36	3.38
12/18/2001	5	0.36	0.03	0	0.01	1.75	0.25	5.36	0.18	0.37	0.03	11.29	2.3
12/19/2001	1	0.61	0.05	0	0.02	2.99	0.38	9.85	0.01	0.68	0.05	0.98	3.87
12/19/2001	2	0.91	0.07	0	0	4.54	0.62	16.19	0.01	0.93	0.07	1.66	6.03
12/19/2001	3	2.39	0.16	0	0.15	5.9	0.8	20.01	0.37	1.3	0.11	2.1	7.7
12/19/2001	4	0.7	0.05	0	0.15	3.84	0.49	13.53	0	0.87	0.08	1.45	5.19
12/20/2001	1	0.63	0.06	0	0.01	3.45	0.41	11.96	0.02	0.78	0.06	1.22	4.52
12/20/2001	2	0.62	0.05	0.04	0	3.51	0.58	11.82	0.03	0.75	0.06	4.96	4.69
12/20/2001	3	1.73	0	0.1	0.11	3.38	0.43	11.49	0.71	0.67	0.04	1.45	4.23
12/20/2001	4	0.46	0.04	0	0.04	2.67	0.39	9.28	0.22	0.55	0.03	11.77	3.84
12/20/2001	5	0.15	0.01	0.01	0.02	0.97	0.11	3.51	0.23	0.21	0.02	49.01	1.65
12/21/2001	3	1.36	0.07	0	0.02	2.08	0.28	7.65	0.46	0.48	0.04	1.24	2.84
1/16/2002	1	0.21	0.01	0	0.03	1.54	0.24	5.16	0.08	0.42	0.03	1.57	2.13
1/16/2002	2	0.4	0.03	0	0	2.38	0.3	8.82	0.04	0.46	0.03	2.82	3.48
1/16/2002	3	0.4	0.33	0	0	2.17	0.23	7.02	0.12	0.59	0	1.46	2.74
1/16/2002	4	0.29	2.67	0	0	5.22	0.47	9.69	0.28	0.78	0.12	0.87	4.25
1/16/2002	5	0.04	0	0	0	0.34	0.02	1.02	0	0.07	0	25.84	0.57
1/17/2002	1	0.44	0.05	0	0	2.49	0.33	8.77	0.01	0.7	0.03	1.44	3.38
1/17/2002	2	0.17	0	0.02	0	1.68	0.27	6.54	0	0.34	0	1.09	1.92
1/17/2002	3	0.61	0.05	0	0	3.56	0.42	12.55	0.07	0.87	0.06	1.8	4.82
1/17/2002	4	0.52	0.05	0	0.02	2.97	0.36	10.21	0.23	0.51	0.03	1.23	4.29
1/17/2002	5	0.07	0.01	0	0	0.45	0.04	1.37	0.05	0.25	0	12.25	0.67

APPENDIX F, CONTINUED
VALID HYDROCARBONS VOC MEASURED BY FID (ppbC)

			C9		C9	C9	C9					alpha-	
Date	Site	nonene-1	paraffin	n-nonane	paraffin	olefin	paraffin	isopropylbenzene	isopropylcyclohexane	benzaldehyde	2,6-dimethyloctane	pinene	3,6-dimethyloctane
12/6/2001	1	0.16	0.13	1.02	0.1	0.07	0	0.38	0.67	0.22	0.08	1.19	0.12
12/6/2001	2	0.4	0.23	1.53	0.17	0.11	0	0.58	1.06	0.22	0.05	1.16	0.22
12/6/2001	3	0.17	0.1	0.99	0.08	0.07	0	0.4	0.61	0.26	0	1.49	0.19
12/6/2001	4	0.15	0.12	1.22	0.07	0.09	0	0.52	0.43	0.64	0.34	1.05	0.17
12/7/2001	1	0.47	0.37	2.93	0.23	0.19	0	1.34	2.23	0.25	2.26	0.9	0.42
12/7/2001	2	0.37	0.48	3.01	0.14	0.18	0	0.9	0.85	2	1.26	1.88	0.59
12/7/2001	3	1.15	0.87	8.04	0.25	0.75	0	2.07	6.01	2.03	0	2.2	2.09
12/7/2001	4	0.07	0.02	0.3	0.02	0.02	0	0.19	0.18	0.11	0.01	0.53	0.05
12/7/2001	5	0.1	0.03	0.43	0.03	0.03	0	0.14	0.21	0.28	0.12	0.35	0.04
12/10/2001	1	0.11	0.03	0.45	0.04	0.04	0	0.19	0.14	0.13	0.07	0.38	0.03
12/10/2001	2	0.12	0.06	0.85	0.06	0.05	0	0.27	0.33	0.47	0	0.61	0.09
12/10/2001	3	0.1	0.03	0.5	0.03	0.04	0	0.3	0.19	0.18	0.14	0.34	0.05
12/10/2001	4	0.06	0	0.2	0	0	0	0.09	0.07	0.05	0.02	0.78	0.02
12/10/2001	5	0.28	0	0.15	0	0.02	0	0.04	0.09	0.29	0.19	0.19	0.03
12/11/2001	1	0.09	0.03	0.4	0.03	0.05	0	0.14	0.23	0.2	0.2	0.12	0.07
12/11/2001	2	0.16	0.04	0.53	0.03	0.03	0	0.18	0.24	0.13	0.08	0.21	0.05
12/11/2001	3	0.14	0.09	0.91	0.07	0.06	0	0.32	0.64	0.2	0.08	0.39	0.18
12/11/2001	4	0.13	0.07	0.66	0.05	0.06	0	0.23	0.31	0.13	0.05	0.24	0.06
12/11/2001	5	0.08	0.01	0.31	0.01	0.02	0	0.09	0.13	0.19	0.07	0.1	0.03
12/12/2001	1	0.07	0.04	0.68	0.02	0.04	0	0.24	0.33	0.21	0.11	0.32	0.09
12/12/2001	2	0.05	0.04	0.48	0.02	0.03	0	0.16	0.23	0.11	0.02	0.21	0.05
12/12/2001	3	0.14	0.09	0.97	0.06	0.06	0	0.35	0.48	0.29	0.06	0.48	0.11
12/12/2001	4	0.11	0.03	0.53	0	0.02	0	0.52	0.31	0.09	0.02	0.37	0.1
12/13/2001	1	0.09	0.04	0.63	0.05	0.04	0	0.48	0.33	0.19	0.11	0.12	0.08
12/13/2001	2	0.08	0.04	0.5	0.02	0.02	0	0.16	0.2	0.09	0	0.11	0.06
12/13/2001	3	0.17	0.11	1.31	0.06	0.08	0	0.36	0.74	0.23	0.03	0.37	0.22
12/13/2001	4	0.23	0.09	1.14	0.13	0.09	0	0.5	0.78	0.18	0.08	0.65	0.17
12/13/2001	5	0.11	0.07	0.76	0.06	0.06	0	0.28	0.56	0.16	0.03	0.52	0.09
12/17/2001	1	0.31	0.17	1.89	0.16	0.12	0	0.82	1.35	0.22	1.45	0.68	0.25
12/17/2001	2	0.48	0.36	2.27	0.24	0.15	0	0.84	1.61	0.21	0.13	0.78	0.33
12/17/2001	3	0.31	0.14	1.47	0.11	0.11	0	0.5	0.92	0.37	1.13	0.54	0.24
12/17/2001	4	0.58	0.47	3.28	0.19	0.21	0	0.82	2.14	0.5	0.94	0.79	0.5
12/17/2001	5	0.06	0.05	0.41	0.02	0.03	0	0.13	0.22	0.22	0.09	0.33	0.05
12/18/2001	1	0.26	0.17	1.2	0.13	0.03	0	0.47	0.72	0.22	0.06	0.48	0.15
12/18/2001	2	0.25	0.24	1.7	0.11	0.09	0	0.43	1.35	0.29	0.14	0.67	0.38
12/18/2001	3	0.25	0.2	1.58	0.13	0.11	0	0.57	1.12	0.25	0.1	0.79	0.27
12/18/2001	4	0.17	0.11	0.94	0.08	0.03	0	0.31	0.57	0.19	0.26	0.38	0.13
12/18/2001	5	0.1	0.06	0.62	0.04	0.04	0	0.2	0.25	0.26	0.27	0.31	0.08
12/19/2001	1	0.19	0.08	0.94	0.1	0.06	0	0.33	0.66	0.1	0.05	0.35	0.12
12/19/2001	2	0.28	0.2	1.43	0.15	0.08	0	0.53	0.94	0.21	0	0.68	0.17
12/19/2001	3	0.52	0.43	3.61	0.21	0.28	0	0.96	2.74	0.49	0.17	1.19	0.8
12/19/2001	4	0.28	0.2	1.26	0.12	0.09	0	0.42	0.86	0.15	0.05	0.41	0.17
12/20/2001	1	0.16	0.09	1.02	0.08	0.06	0	0.36	0.6	0.16	0.07	0.53	0.16
12/20/2001	2	0.37	0.31	1.76	0.12	0.11	0	0.52	1.51	0.23	0.08	0.63	0.4
12/20/2001	3	0.2	0.09	1.09	0.08	0.06	0	0.39	0.63	0.36	0.41	0.03	0.17
12/20/2001	4	0.13	0.11	0.96	0.08	0.04	0	0.31	0.81	0.14	0.04	0.66	0.15
12/20/2001	5	0.07	0.02	0.34	0.03	0.03	0	0.11	0.07	0.04	0.28	0.03	0.04
12/21/2001	3	0.11	0.11	0.86	0.05	0.06	0	0.28	0.51	0.47	0.12	0.4	0.17
1/16/2002	1	0.15	0.1	0.89	0.03	0.05	0	0.22	0.74	0.17	0.13	0.34	0.21
1/16/2002	2	0.14	0.06	0.84	0.05	0.05	0	0.27	0.28	0.66	0.33	0.48	0.07
1/16/2002	3	0.11	0.04	0.59	0.03	0.03	0	0.33	0.2	0.4	0.07	0.6	0.06
1/16/2002	4	0.15	0.18	0.71	0.05	0.15	0	0.96	0.71	0.24	0.29	0.45	0.35
1/16/2002	5	0.06	0	0.14	0	0	0	0.05	0.04	0.28	0.26	0.1	0.02
1/17/2002	1	0.17	0.07	0.85	0.04	0.06	0	0.3	0.46	0.36	0.16	0.31	0.1
1/17/2002	2	0.07	0.04	0.42	0.02	0.02	0	0.15	0.05	0.08	0.26	0.03	0.03
1/17/2002	3	0.25	0.13	1.15	0.08	0.07	0	0.42	0.65	0.34	0.2	0.69	0.21
1/17/2002	4	0.17	0.11	0.81	0.04	0.07	0	0.52	0.58	0.16	0.32	0.37	0.12
1/17/2002	5	0.08	0.02	0.18	0	0	0	0.05	0.06	0.17	0.38	0.1	0.01

APPENDIX F, CONTINUED
VALID HYDROCARBONS VOC MEASURED BY FID (ppbC)

Date	Site	n-propylbenzene	m-ethyltoluene	p-ethyltoluene	1,3,5-trimethylbenzene	C10 paraffin	o-ethyltoluene	octanal	beta-pinene	decene-1 +_ bkg	1,2,4-trimethylbenzene	n-decane	C10 aromatic	isobutylbenzene
12/6/2001	1	0.87	3.07	1.31	1.55	0.07	1.16	1.1	0.19	56.52	0.61	1.35	0	0.38
12/6/2001	2	1.43	5.39	2.21	2.98	0.1	1.78	1.06	0.31	10.53	0.18	1.73	0	0.91
12/6/2001	3	0.98	3.38	1.42	1.97	0.08	1.13	0.88	0.51	17.54	0.27	1.17	0	0.51
12/6/2001	4	1.51	4.98	2.2	2.51	0.05	1.77	1.76	0.21	40.83	0.52	1.58	0	0.49
12/7/2001	1	3.97	14.06	6.39	7.23	0.09	5.21	1.45	0.6	57.96	0.79	3.63	0	1.1
12/7/2001	2	2.35	7.79	3.41	4.13	0.07	2.6	1.55	0.44	15.41	0.15	4.81	0	1.32
12/7/2001	3	4.97	15.17	6.42	8.12	0	5.85	1.14	1.63	52.07	0.61	10.47	0.41	2.07
12/7/2001	4	0.51	1.77	0.86	0.86	0.02	0.64	0.66	0.07	5.83	0.04	0.4	0	0.11
12/7/2001	5	0.36	1.13	0.46	0.46	0.03	0.39	1.11	0.1	19.24	0.15	0.53	0	0.16
12/10/2001	1	0.47	1.79	0.78	0.89	0.04	0.61	1.14	0.13	23.8	0.14	0.43	0	0.27
12/10/2001	2	0.71	2.58	1.06	1.4	0.07	0.88	1.26	0.17	9.96	0.12	1.12	0	0.44
12/10/2001	3	0.91	3.26	1.41	1.58	0.01	1.18	0.13	0.19	21.5	0.19	0.71	0	0.19
12/10/2001	4	0.22	0.66	0.48	0.23	0	0.21	0.59	0.07	9.11	0.07	0.32	0.03	0.08
12/10/2001	5	0.13	0.27	0.11	0.06	0.01	0.12	1.77	0.12	35.58	0.55	0.17	0	0.07
12/11/2001	1	0.31	1.02	0.42	0.4	0.02	0.33	0.54	0.05	6.44	0.08	0.51	0	0.18
12/11/2001	2	0.4	1.36	0.59	0.73	0.02	0.47	0.43	0.08	11.07	0.13	0.5	0	0.1
12/11/2001	3	0.8	2.84	1.16	1.54	0.09	0.93	0.29	0.18	7.75	0.09	2.08	0	0.47
12/11/2001	4	0.55	1.92	0.78	0.94	0.03	0.63	0.39	0.07	6.51	0.09	0.49	0	0.14
12/11/2001	5	0.32	0.87	0.37	0.29	0	0.3	0.84	0.05	20.4	0.13	0.32	0	0.11
12/12/2001	1	0.6	2.1	1.07	1.07	0.07	0.75	1.59	0.14	23.23	0.28	0.66	0	0.21
12/12/2001	2	0.34	1.1	0.53	0.48	0.04	0.38	0.45	0.06	4.64	0.11	0.62	0	0.13
12/12/2001	3	0.8	2.97	1.27	1.59	0.04	1.04	0.26	0.19	15.76	0.17	1.12	0	0.36
12/12/2001	4	1.82	5.8	2.68	2.61	0.03	2.21	0.26	0.07	14.24	0.25	0.87	0.05	0.21
12/13/2001	1	1.79	5.53	2.55	2.28	0.07	2.07	1.4	0.1	15.23	0.06	0.65	0	0.3
12/13/2001	2	0.41	1.18	0.57	0.47	0.02	0.44	0.14	0.11	2.99	0.05	0.54	0	0.18
12/13/2001	3	0.7	2.55	0.98	1.26	0.05	0.86	0.24	0.24	7.82	0.08	1.26	0	0.45
12/13/2001	4	1.28	4.49	1.83	2.21	0.06	1.52	0.63	0.17	10.83	0.14	1.23	0	0.48
12/13/2001	5	0.67	2.1	0.89	0.89	0.04	0.79	0.76	0.2	6.9	0.06	0.88	0	0.32
12/17/2001	1	1.93	7.18	3.11	3.35	0.11	2.49	0.69	0.22	25.24	0.11	2.05	0	0.6
12/17/2001	2	1.93	7.19	2.99	3.97	0.11	2.36	0.36	0.28	13.28	0.11	2.46	0	0.89
12/17/2001	3	1.14	4.18	1.73	2.15	0.11	1.39	0.74	0.24	13.54	0.18	1.85	0	0.55
12/17/2001	4	1.19	3.63	1.59	1.67	0.17	1.23	1.67	0.37	12.74	0.18	3.39	0.09	0.86
12/17/2001	5	0.33	0.95	0.39	0.36	0	0.36	0.86	0.1	18.81	0.08	0.54	0	0.17
12/18/2001	1	1.15	4.16	1.75	1.99	0.07	1.49	0.49	0.13	17.33	0.17	1.23	0	0.48
12/18/2001	2	0.94	3.1	1.34	1.55	0.09	1.07	1.11	0.17	6.19	0.09	3.37	0	0.4
12/18/2001	3	1.48	5.07	2.16	2.59	0.08	1.77	0.6	0.24	11.94	0.16	1.81	0	0.55
12/18/2001	4	0.74	2.41	0.96	1.19	0.04	0.79	0.47	0.12	13.05	0.13	1.02	0	0.22
12/18/2001	5	0.48	1.33	0.62	0.52	0.03	0.49	0.7	0.08	22.64	0.24	0.73	0	0.21
12/19/2001	1	0.82	2.51	1.11	1.28	0.07	0.92	0.89	0.09	7.16	0.06	0.96	0	0.17
12/19/2001	2	1.28	4.36	1.84	2.15	0.1	1.44	0.97	0.18	9.43	0.05	1.62	0	0.58
12/19/2001	3	2.03	6.69	2.67	3.36	0.15	2.39	0.54	0.79	15.74	0.18	4.51	0	0.92
12/19/2001	4	1.1	3.79	1.61	1.79	0.06	1.33	0.37	0.14	7.56	0.09	1.37	0	0.52
12/20/2001	1	0.86	2.93	1.26	1.37	0.04	1.04	0.28	0.14	12.16	0.15	1.04	0	0.36
12/20/2001	2	1.06	3.42	1.38	1.76	0.08	1.14	0.73	0.26	7.39	0.09	3.67	0	0.64
12/20/2001	3	0.97	3.27	1.37	1.58	0.09	1.09	0.4	0.31	7.6	0.1	1.36	0	0.6
12/20/2001	4	1.03	2.7	1.22	1.36	0.05	0.96	0.23	0.05	10.49	0.09	0.97	0	0.33
12/20/2001	5	0.27	0.94	0.42	0.45	0.01	0.33	0.72	0.12	12.74	0.13	0.38	0	0.23
12/21/2001	3	0.62	2.43	0.99	1.3	0.05	0.82	0.59	0.4	12.53	0.12	1.32	0	0.46
1/16/2002	1	0.5	1.66	0.68	1.03	0.04	0.55	2.55	0.27	21.05	0.31	1.33	0	0.24
1/16/2002	2	0.81	2.61	1.12	1.38	0.02	0.88	1.79	0.39	11.53	0.19	1	0	0.51
1/16/2002	3	1.04	3.68	1.61	1.77	0.03	1.33	0.81	0.31	23.86	0.22	0.73	0	0.33
1/16/2002	4	3.5	11.57	5.07	5.56	0.06	4.23	0.85	0.28	21.24	0.2	0.9	0.03	0.6
1/16/2002	5	0.14	0.29	0.1	0.14	0	0.11	1.49	0.12	29.4	0.2	0.16	0	0.05
1/17/2002	1	0.82	2.63	1.11	1.31	0.04	0.88	1.5	0.24	15.63	0.18	1.04	0	0.33
1/17/2002	2	0.44	1.46	0.62	0.75	0.04	0.52	0.22	0.06	5.24	0.07	0.36	0	0.32
1/17/2002	3	1.17	4.05	1.75	2.15	0.05	1.39	1.03	0.28	9.09	0.16	1.27	0	0.43
1/17/2002	4	1.41	5.08	2.2	2.51	0.05	1.78	0.28	0.11	12.77	0.2	0.73	0	0.35
1/17/2002	5	0.14	0.37	0.13	0.12	0.01	0.11	0.17	0.03	25.5	0.15	0.13	0	0.08

APPENDIX F, CONTINUED
VALID HYDROCARBONS VOC MEASURED BY FID (ppbC)

Date	Site	sec-butylbenzene	C10 olefin	1,2,3-trimethylbenzene	C10 paraffin	limonene	indan	indene	1,3-diethylbenzene	C10 aromatic	1,4-diethylbenzene	n-butylbenzene	1,2-diethylbenzene	2-propyl toluene
12/6/2001	1	0.03	0.87	1.4	0.2	1.52	0.96	0.19	0.37	0.56	0.88	0	2.25	0.05
12/6/2001	2	0.16	0.58	2.63	0.27	5	1.27	0.24	0.65	0.99	1.92	0	1.09	0.1
12/6/2001	3	0.08	0.24	1.6	0.18	1.23	0.89	0.16	0.27	0.74	1.45	0	0.03	0.05
12/6/2001	4	0.13	0.2	1.78	0.23	0.73	0.73	0.32	0.38	0.64	1.02	0	0.17	0.09
12/7/2001	1	0.12	0	5.12	0.36	1.78	2.27	0.82	1.14	2.17	3.65	0	0.05	0.09
12/7/2001	2	0.13	2.02	3.47	0.43	2.64	1.49	0.23	0.75	1.31	2.24	0	5.39	0.11
12/7/2001	3	0.67	0.76	7.04	0.44	2.27	2.43	0.46	1.24	2.65	4.06	0	0.23	0.19
12/7/2001	4	0.05	0.14	0.69	0.05	0.38	0.26	0.06	0.07	0.18	0.22	0	0.01	0.01
12/7/2001	5	0.02	0.07	0.52	0.08	0.15	0.38	0.08	0.07	0.17	0.35	0	0.07	0.02
12/10/2001	1	0.04	0.11	0.78	0.08	0.58	0.67	0.04	0.16	0.31	0.52	0	0.08	0.01
12/10/2001	2	0.04	0.38	1.24	0.12	4.66	0.88	0.12	0.24	0.44	0.88	0	0.25	0.04
12/10/2001	3	0.08	0.1	1.19	0.06	0.78	0.4	0.09	0.19	0.43	0.8	0	0.11	0.01
12/10/2001	4	0	0.13	0.28	0.04	0.14	0.13	0	0.04	0.08	0.16	0	0.08	0.01
12/10/2001	5	0	0.03	0.23	0.01	0.05	0.24	0.03	0.02	0.02	0.06	0	0	0
12/11/2001	1	0.02	0.08	0.41	0.07	0.22	0.26	0.02	0.09	0.14	0.21	0	0.07	0.02
12/11/2001	2	0.02	0.11	0.56	0.09	0.93	0.33	0.08	0.13	0.27	0.38	0	0.07	0.01
12/11/2001	3	0.06	0.23	1.29	0.09	1.28	0.87	0.17	0.32	0.55	0.81	0	0.81	0.09
12/11/2001	4	0.03	0.04	0.64	0.05	0.22	0.33	0.04	0.13	0.25	0.3	0	0.08	0
12/11/2001	5	0	0.02	0.32	0.03	0.05	0.16	0.03	0.06	0.13	0.12	0	0	0.01
12/12/2001	1	0.05	0.14	0.83	0.04	1.22	0.6	0.16	0.24	0.39	0.85	0	0.11	0.03
12/12/2001	2	0.02	0.1	0.46	0.05	0.97	0.2	0.07	0.12	0.19	0.38	0	0.07	0.01
12/12/2001	3	0.04	0.08	1.28	0.11	0.83	0.47	0.14	0.23	0.46	0.85	0	0.17	0.03
12/12/2001	4	0.16	0.13	1.78	0.15	0.26	0.45	0.02	0.31	0.4	0.64	0	0.13	0.06
12/13/2001	1	0.17	0.08	1.38	0.05	0.82	0.46	0.06	0.23	0.45	0.62	0	0.08	0.02
12/13/2001	2	0.04	0.12	0.46	0.05	0.44	0.22	0.07	0.07	0.19	0.18	0	0.06	0.01
12/13/2001	3	0.05	0.2	1.11	0.09	1.49	0.45	0.03	0.16	0.37	0.83	0	0.16	0.04
12/13/2001	4	0.05	0.28	1.89	0.28	0.85	1.05	0.11	0.22	0.78	1.46	0	0.04	0.33
12/13/2001	5	0.04	0.13	0.97	0.17	0.28	0.56	0.18	0.18	0.34	0.4	0	0.13	0.1
12/17/2001	1	0.07	0.33	2.74	0.28	1.06	1.6	0.38	0.54	1.21	2.47	0	0.39	0.1
12/17/2001	2	0.1	0.24	2.78	0.17	2.22	1.48	0.21	0.63	1.12	2.18	0	0.4	0.08
12/17/2001	3	0.06	0.3	1.72	0.2	2.16	1.01	0.39	0.38	0.79	1.49	0	0.21	0.04
12/17/2001	4	0.14	0.29	2.19	1.05	0.24	4.95	0.65	1.32	0.4	0.75	0	0.19	0.28
12/17/2001	5	0.02	0.11	0.52	0.09	0.23	0.38	0.09	0.16	0.18	0.32	0	0.07	0.04
12/18/2001	1	0.05	0.16	1.61	0.2	0.96	0.89	0.21	0.47	0.78	1.11	0	0.01	0.06
12/18/2001	2	0.08	0.29	1.39	0.19	2.18	1.06	0.73	0.36	0.55	0.9	0	0.04	0.11
12/18/2001	3	0.08	0.28	2.11	0.25	1.76	1.35	0.26	0.51	0.81	1.55	0	0.02	0.06
12/18/2001	4	0.03	0.06	0.96	0.18	0.46	0.46	0.13	0.3	0.4	0.54	0	0.15	0.04
12/18/2001	5	0.04	0.08	0.57	0.1	0.12	0.28	0.13	0.17	0.2	0.26	0	0.02	0.03
12/19/2001	1	0.03	0.16	1.05	0.15	0.27	0.65	0.21	0.24	0.46	0.87	0	0.01	0.06
12/19/2001	2	0.1	0.39	1.7	0.23	5.47	0.97	0.36	0.44	0.73	1.27	0	0.48	0.06
12/19/2001	3	0.11	0.35	3.37	0.27	2.33	1.54	1.12	0.67	1.25	1.83	0	0.13	0.11
12/19/2001	4	0.06	0.11	1.47	0.16	0.93	0.73	0.26	0.37	0.65	0.99	0	0.17	0.03
12/20/2001	1	0.05	0.13	1.22	0.1	0.94	0.51	0.11	0.28	0.5	0.93	0	0.15	0.03
12/20/2001	2	0.05	0.3	1.64	0.14	2.06	1.08	0.85	0.28	0.64	0.78	0	0.08	0.1
12/20/2001	3	0.03	0.2	1.46	0.14	2.29	0.59	0.06	0.05	0.5	0.97	0	0.14	0.03
12/20/2001	4	0.03	0.15	1.21	0.14	0.56	0.91	0.15	0.23	0.46	0.83	0	0.14	0.05
12/20/2001	5	0.02	0.03	0.6	0.04	0.3	0.55	0.07	0.04	0.15	0.24	0	0.03	0.01
12/21/2001	3	0.04	0.26	1.12	0.07	2.39	0.43	0.17	0.15	0.37	0.76	0	0.02	0.02
1/16/2002	1	0.04	0.2	0.74	0.06	0.35	0.38	0.21	0.1	0.24	0.48	0	0.03	0.04
1/16/2002	2	0.07	0.17	1.18	0.11	5.64	0.43	0.14	0.2	0.43	1.1	0	0.55	0.02
1/16/2002	3	0.09	0.71	1.34	0.08	1.06	0.43	0.08	0.16	0.47	0.82	0	0.14	0.06
1/16/2002	4	0.37	0.67	3.68	0.13	0.27	1.42	0.82	0.62	1.04	1.56	0	0.33	0.05
1/16/2002	5	0	0.16	0.14	0.02	0.07	0.08	0	0.04	0.03	0.1	0	0.03	0
1/17/2002	1	0.03	0.07	1.06	0.1	0.46	0.44	0.16	0.23	0.4	0.54	0	0.15	0.02
1/17/2002	2	0.02	0.04	0.64	0.06	0.48	0.25	0.08	0.13	0.2	0.44	0	1.08	0.02
1/17/2002	3	0.11	0.4	1.68	0.09	1.12	0.7	0.17	0.25	0.51	1	0	0.18	0.03
1/17/2002	4	0.05	0.29	1.83	0.15	0.68	0.78	0.28	0.4	0.67	1.19	0	0.03	0.04
1/17/2002	5	0	0.05	0.17	0.02	0.18	0.21	0.03	0.06	0.06	0.12	0	0.05	0.01

APPENDIX F, CONTINUED
VALID HYDROCARBONS VOC MEASURED BY FID (ppbC)

Date	Site	C10 aromatic	1,3-dimethyl-4-ethylbenzene	C10 aromatic	C10 aromatic	isopropyltoluene	nonanal	undecene-1	n-undecane	C10 aromatic	C11 paraffin	1,2,4,5-tetramethylbenzene	1,2,3,5-tetramethylbenzene
12/6/2001	1	0	0	0.29	0.25	1.16	2.64	0	1.26	0	1.02	0.54	0.44
12/6/2001	2	0	0	0.63	0.51	1.43	0.98	0	1.44	0.19	0.59	0.79	0.82
12/6/2001	3	0	0	0.36	0.29	0.66	0.69	0	0.95	0.04	0.07	0.38	0.47
12/6/2001	4	0	0	0.34	0.25	0.56	6.54	0	1.36	0.23	0.15	0.4	0.39
12/7/2001	1	0	0	1.15	0.77	1.71	1.71	0	2.51	0.06	0.2	1.18	1.1
12/7/2001	2	0	0	0.6	0.46	2.72	1.86	0	2.67	0	2.49	1.05	0.74
12/7/2001	3	0	0	1.38	0.88	1.85	0.09	0	3.84	0.11	0.34	0.86	1.03
12/7/2001	4	0	0	0.09	0.06	0.11	0.95	0	0.46	0	0	0.07	0.08
12/7/2001	5	0	0	0.1	0.08	0.18	1.75	0	0.44	0.02	0.02	0.11	0.1
12/10/2001	1	0	0	0.18	0.15	0.32	1.69	0	0.41	0.02	0.03	0.23	0.24
12/10/2001	2	0	0	0.25	0.19	0.54	0.79	0	0.84	0.07	0.15	0.31	0.35
12/10/2001	3	0	0	0.17	0.13	0.38	0.02	0	0.57	0.03	0.03	0.2	
12/10/2001	4	0	0	0.01	0.02	0.09	0.08	0	0.35	0	0.02	0.07	0.04
12/10/2001	5	0	0	0	0	0.03	1.82	0	0.19	0.03	0.02	0.06	0.05
12/11/2001	1	0	0	0.08	0.05	0.05	0.77	0	0.36	0.02	0	0.1	0.08
12/11/2001	2	0	0	0.14	0.12	0.27	0.21	0	0.44	0.02	0.07	0.15	0.17
12/11/2001	3	0	0	0.48	0.2	0.57	0.15	0	6.48	0.06	0.46	0.77	0.41
12/11/2001	4	0	0	0.12	0.1	0.25	0.16	0	0.26	0	0.03	0.11	0.15
12/11/2001	5	0	0	0.08	0.06	0.14	0.09	0	0.25	0	0	0.06	0.06
12/12/2001	1	0	0	0.22	0.17	0.3	3.38	0	0.5	0.03	0.03	0.23	0.25
12/12/2001	2	0	0	0.09	0.08	0.23	0.14	0	0.5	0	0.07	0.14	0.13
12/12/2001	3	0	0	0.26	0.22	0.52	0.01	0	0.84	0.02	0.05	0.29	0.32
12/12/2001	4	0	0	0.13	0.07	0.18	0.26	0	0.67	0.04	0.08	0.06	0.08
12/13/2001	1	0	0	0.21	0.13	0.26	3.75	0	0.46	0	0.01	0.12	0.11
12/13/2001	2	0	0	0.08	0.07	0.22	0.1	0	0.36	0.08	0.05	0.1	0.09
12/13/2001	3	0	0	0.25	0.16	0.41	0.36	0	0.78	0.04	0.06	0.25	0.25
12/13/2001	4	0	0	0.5	0.48	1	0.61	0	1.03	0.07	0.1	0.58	0.63
12/13/2001	5	0	0	0.2	0.14	0.38	0.82	0	0.67	0.13	0.06	0.2	0.21
12/17/2001	1	0	0	0.75	0.56	1.26	0.99	0	1.54	0.03	0.15	0.71	0.91
12/17/2001	2	0	0	0.74	0.59	1.29	1.01	0	1.1	0.07	0.09	0.67	0.81
12/17/2001	3	0	0	0.45	0.33	0.76	1.77	0	1.18	0.09	0.09	0.46	0.55
12/17/2001	4	0	0	0.35	0.23	0.49	1.74	0	1.61	0.19	0.14	0.31	0.34
12/17/2001	5	0	0	0.12	0.06	0.14	0.76	0	0.41	0.03	0.04	0.09	0.11
12/18/2001	1	0	0	0.43	0.38	0.85	0.33	0	0.91	0.15	0.11	0.46	0.55
12/18/2001	2	0	0	0.38	0.23	0.47	2.35	0	1.83	0.05	0.11	0.36	0.34
12/18/2001	3	0	0	0.47	0.35	0.85	0.6	0	1.25	0.2	0.11	0.5	0.56
12/18/2001	4	0	0	0.21	0.16	0.37	0.11	0	0.68	0.05	0.07	0.19	0.23
12/18/2001	5	0	0	0.13	0.08	0.2	0.19	0	0.55	0.04	0.03	0.11	0.09
12/19/2001	1	0	0	0.27	0.2	0.44	2.13	0	0.65	0.13	0.07	0.36	0.38
12/19/2001	2	0	0	0.44	0.34	0.77	1.66	0	1.04	0.12	0.27	0.41	0.45
12/19/2001	3	0	0	0.71	0.47	0.99	0.32	0	2.12	0.06	0.16	0.61	0.65
12/19/2001	4	0	0	0.33	0.28	0.67	0.04	0	0.71	0	0.03	0.31	0.4
12/20/2001	1	0	0	0.29	0.23	0.58	0.03	0	0.7	0.03	0.05	0.3	0.36
12/20/2001	2	0	0	0.39	0.21	0.57	0.17	0	2.17	0.15	0.17	0.44	0.38
12/20/2001	3	0	0	0.29	0.24	0.56	0.25	0	0.92	0.06	0.08	0.33	0.35
12/20/2001	4	0	0	0.25	0.19	0.37	6.97	0	0.79	0.02	0.03	0.27	0.3
12/20/2001	5	0	0	0.1	0.07	0.17	0.45	0	0.32	0.03	0.03	0.09	0.1
12/21/2001	3	0	0	0.25	0.17	0.41	0.42	0	0.74	0.01	0.04	0.23	0.31
1/16/2002	1	0	0	0.17	0.1	0.15	11.73	0	0.54	0.03	0.08	0.16	0.15
1/16/2002	2	0	0	0.23	0.18	0.67	0.29	0	0.79	0.06	0.29	0.34	0.36
1/16/2002	3	0	0	0.2	0.14	0.36	0.26	0	0.58	0	0.04	0.27	0.24
1/16/2002	4	0	0	0.68	0.27	0.81	0.89	0	0.99	0.26	0.38	0.57	0.55
1/16/2002	5	0	0	0.13	0.03	0.03	1.47	0	0.14	0	0	0.04	0.03
1/17/2002	1	0	0	0.26	0.18	0.41	2.14	0	0.76	0.02	0.05	0.24	0.22
1/17/2002	2	0	0	0.1	0.08	0.47	0.54	0	0.13	0.03	0.02	0.18	0.12
1/17/2002	3	0	0	0.35	0.27	0.63	0.57	0	0.99	0.04	0.07	0.39	0.42
1/17/2002	4	0	0	0.39	0.25	0.61	0.16	0	0.49	0.05	0.1	0.35	0.38
1/17/2002	5	0	0	0.03	0.03	0.08	0.23	0	0.12	0	0.02	0.06	0.04

APPENDIX F, CONTINUED
VALID HYDROCARBONS VOC MEASURED BY FID (ppbC)

Date	Site	C11 paraffin	1,2,3,4-trimethylbenzene	2-methylindan	1-methylindan	C11 aromatic	C11 aromatic	dodecene-1	naphthalene	n-dodecane	Total ID'd NMHC	Unidentified	Identified oxygenated (ppbv)	Identified others
12/6/2001	1	0.24	0.29	0	0.09	0.06	0.01	0.04	0.79	0.57	332.98	59.6	13.41	1.82
12/6/2001	2	0.42	0.31	0	0.09	0.11	0	0.04	1.02	0.67	436.97	51.65	10.92	2.27
12/6/2001	3	0.23	0.16	0	0.07	0.06	0	0.02	0.6	0.36	293.42	40.02	15.47	0
12/6/2001	4	0.22	0.26	0	0.11	0.07	0.02	0	0.99	0.79	357.27	69.42	81.9	1.95
12/7/2001	1	0.64	1.28	0	0.33	0.28	0.06	1.07	1.95	1.43	596.66	101.71	252.85	2.98
12/7/2001	2	0.36	0.42	0	0.14	0.08	0.02	0.07	0.9	1.14	438.76	76.24	14.92	2.65
12/7/2001	3	0.46	0.41	0	0.18	0.06	0.06	0.09	0.66	0.72	667.51	80.73	67.7	2.15
12/7/2001	4	0.05	0.04	0	0.05	0.03	0	0	0.11	0.21	99.54	10.57	6.45	1.23
12/7/2001	5	0.08	0.1	0	0.04	0.02	0	0	0.37	0.3	139.33	23.98	10.97	1.22
12/10/2001	1	0.17	0.1	0	0.04	0.04	0.02	0	0.41	0.23	206.88	30.67	12.26	1.39
12/10/2001	2	0.18	0	0	0.06	0.04	0	0	0.31	0.29	219.64	31.87	13.67	1.52
12/10/2001	3	0.11	0.11	0	0.05	0.03	0	0	0.09	0.09	177.81	18.67	5.4	1.43
12/10/2001	4	0.04	0.09	0	0.05	0.02	0.02	0	0.04	0.14	62.57	5.29	4.31	1.19
12/10/2001	5	0	0.03	0	0.02	0	0	0	0.13	0.15	104.67	23.08	14.5	1.18
12/11/2001	1	0.07	0.06	0	0.01	0	0	0	0.15	0.13	106.94	12.45	8.3	1.49
12/11/2001	2	0.13	0.14	0	0.04	0.03	0	0	0.37	0.14	126.77	18.34	7.12	1.37
12/11/2001	3	0.2	0.17	0	0.32	0.03	0.04	0.04	0.65	1.02	285.57	30.54	36.66	1.6
12/11/2001	4	0.1	0.06	0	0.03	0	0	0	0.08	0	155.04	18.9	5.01	1.11
12/11/2001	5	0.03	0.1	0	0.02	0	0	0	0.07	0.06	128.99	9.29	4.6	1.25
12/12/2001	1	0.16	0.12	0	0.06	0.04	0.1	0.16	0.54	0.23	209.94	41.26	36.21	1.69
12/12/2001	2	0.07	0.09	0	0.04	0.03	0	0	0.09	0.13	103.78	9.73	7.01	1.48
12/12/2001	3	0.18	0.12	0	0.06	0.04	0	0	0.26	0.26	258.91	31.63	7.72	1.3
12/12/2001	4	0.05	0.07	0	0.06	0.03	0	0	0.05	0.14	105.26	12.97	3.83	1.57
12/13/2001	1	0.06	0.05	0	0.04	0.02	0	0	0.13	0.13	182.21	36.7	24.07	2.09
12/13/2001	2	0.06	0.08	0	0.03	0.02	0	0	0.24	0.17	79.5	50.79	125.66	1.36
12/13/2001	3	0.16	0.09	0	0.05	0.03	0.03	0	0.46	0.3	244.52	31.48	9.74	1.17
12/13/2001	4	0.38	0.41	0	0.09	0.12	0.02	0	1.29	0.68	397.69	38.6	45.75	1.5
12/13/2001	5	0.16	0.13	0	0.05	0.07	0	0	0.3	0.25	234	30.03	8.7	1.89
12/17/2001	1	0.51	0.4	0	0.2	0.19	0.08	0.21	1.88	0.88	578.59	58.38	70.9	2.46
12/17/2001	2	0.51	0.36	0	0.08	0.09	0.01	0.08	1.31	0.45	550.33	46.24	32.03	4.54
12/17/2001	3	0.28	0.26	0	0.1	0.08	0	0	1.2	0.71	427.69	42.91	44.85	1.76
12/17/2001	4	0.17	0.21	0	0.08	0.06	0	0.09	0.61	0.73	815.89	76.9	13.56	1.81
12/17/2001	5	0.04	0.12	0	0.03	0.03	0	0	0.26	0.22	182.1	29.28	14.28	1.25
12/18/2001	1	0.3	0.28	0	0.07	0.08	0.01	0.04	0.65	0.4	377.57	28.91	30.73	1.7
12/18/2001	2	0.2	0.17	0	0.1	0.08	0.01	0.06	0.86	0.76	308.04	50.36	26.27	2.62
12/18/2001	3	0.32	0.24	0	0.1	0.06	0.01	0.09	0.98	0.68	451.85	39.05	38.1	1.32
12/18/2001	4	0.12	0.09	0	0.05	0.04	0.01	0	0.14	0.14	242.94	28.33	8.6	1.53
12/18/2001	5	0.06	0.06	0	0.04	0.04	0	0	0.13	0.16	223.94	23.03	8.65	1.12
12/19/2001	1	0.21	0.18	0	0.06	0.05	0	0	0.62	0.4	276.2	26.8	21.26	1.45
12/19/2001	2	0.27	0.24	0	0.08	0.08	0.03	0.07	0.71	0.49	392.43	40.71	12.56	1.67
12/19/2001	3	0.37	0.33	0	0.13	0.1	0.03	0.08	0.82	0.65	588.13	78.35	18.71	2.03
12/19/2001	4	0.25	0.15	0	0.05	0.06	0	0	0.27	0.17	328.55	25.86	16.61	2.16
12/20/2001	1	0.23	0.09	0	0.06	0.04	0	0	0.25	0.16	284.94	34.62	8.47	1.63
12/20/2001	2	0.22	0.22	0	0.12	0.05	0.02	0.04	0.61	0.59	302.12	43.71	9.15	1.87
12/20/2001	3	0.22	0.17	0	0.07	0.05	0	0	0.38	0.27	342.45	40.69	9.19	1.58
12/20/2001	4	0.18	0.14	0	0.06	0.03	0	0.02	0.35	0.42	265.8	69.84	29.44	1.68
12/20/2001	5	0.05	0.07	0	0.03	0.02	0	0	0.12	0.09	161.57	17.19	5.88	1.11
12/21/2001	3	0.16	0.11	0	0.05	0.04	0.01	0.1	0.61	0.35	214.27	35.96	12.94	1.69
1/16/2002	1	0.1	0.16	0	0.04	0.05	0	0	0.41	0.17	165.58	35.74	35.88	1.43
1/16/2002	2	0.17	0.42	0	0.06	0.04	0	0	0.08	0.16	284.01	29.68	15.69	1.67
1/16/2002	3	0.11	0.12	0	0.06	0.03	0	0	0.26	0.24	205.75	38.68	16.13	1.36
1/16/2002	4	0.33	0.47	0	0.48	0.08	0.04	0.05	0.51	0.57	196.95	37.84	18.39	1.16
1/16/2002	5	0.05	0.03	0	0	0	0	0	0.04	0.07	111.68	18.87	9.89	1.16
1/17/2002	1	0.17	0.17	0	0.06	0.04	0.03	0	0.23	0.29	229.33	27.83	18.75	1.41
1/17/2002	2	0.09	0.16	0	0.05	0.03	0	0	0.23	0.02	159.67	30.68	25.3	1.46
1/17/2002	3	0.22	0.19	0	0.1	0.05	0.04	0	0.64	0.52	300.54	42.01	21.41	1.59
1/17/2002	4	0.22	0.21	0	0.09	0.05	0.07	0	0.12	0.05	254.56	25.93	9.4	1.4
1/17/2002	5	0.06	0.04	0	0	0	0	0	0.16	0.05	101.58	16.86	13.26	1.24

APPENDIX G
VALID HALOCARBON VOC MEASURED BY ECD. ppb

Date	Site	F 12	F 114	methylbromide	F 11	vinylidenechloride	F 113	trans-1,2-dichloroethylene	cis-1,2,-dichloroethylene	chloroform	1,2-dichloroethane	methyl chloroform	1,3-dibromomethane
12/6/2001	1	1.08	0.03	0.04	0.67	0	0.21	0	0	0.08	0.1	0.11	0
12/6/2001	2	1.18	0.01	0.04	0.64	0	0.2	0	0	0.12	0.1	0.11	0
12/6/2001	3	0.94	0.03	0.05	0.54	0	0.18	0	0	0.09	0.09	0.1	0
12/6/2001	4	1.27	0.06	0.06	0.69	0	0.22	0	0	0.07	0.07	0.13	0
12/7/2001	1	1.08	0.14	0.08	0.55	0	0.22	0	0	0.07	0.08	0.14	0
12/7/2001	2	0.98	0.06	0.04	0.54	0	0.45	0	0	0.27	0.07	0.11	0
12/7/2001	3	1.09	0.1	0.05	0.61	0	0.22	0	0	0.15	0.11	0.13	0
12/7/2001	4	0.92	0.04	0.05	0.56	0	0.19	0	0	0.04	0.06	0.09	0
12/7/2001	5	1.03	0.08	0.07	0.75	0	0.21	0	0	0.06	0.09	0.11	0
12/10/2001	1	0.98	0.03	0.05	0.57	0	0.19	0	0	0.05	0.08	0.11	0
12/10/2001	2	0.95	0.02	0.05	0.58	0	0.24	0	0	0.16	0.06	0.1	0
12/10/2001	3	0.99	0.05	0.03	0.63	0	0.21	0	0	0.05	0.04	0.1	0
12/10/2001	4	0.92	0.02	0.03	0.55	0	0.18	0	0	0.03	0.07	0.1	0
12/10/2001	5	0.92	0.02	0.05	0.71	0	0.18	0	0	0.03	0.06	0.1	0
12/11/2001	1	1.12	0.02	0.04	0.55	0	0.19	0	0	0.04	0.09	0.11	0
12/11/2001	2	0.96	0.01	0.05	0.54	0	0.21	0	0	0.08	0.1	0.11	0
12/11/2001	3	0.94	0.02	0.04	0.53	0	0.19	0	0	0.07	0.1	0.11	0
12/11/2001	4	0.97	0.03	0.05	0.6	0	0.2	0	0	0.04	0.11	0.11	0
12/11/2001	5	0.94	0.01	0.06	0.66	0	0.19	0	0	0.04	0.08	0.1	0
12/12/2001	1	0.93	0.01	0.04	0.54	0	0.19	0	0	0.04	0.06	0.11	0
12/12/2001	2	0.92	0.02	0.02	0.51	0	0.2	0	0	0.08	0.08	0.09	0
12/12/2001	3	1.01	0	0.03	0.6	0	0.19	0	0	0.07	0.02	0.11	0
12/12/2001	4	0.94	0.01	0.04	0.55	0	0.2	0	0	0.03	0.07	0.11	0
12/13/2001	1	1.04	0.03	0.05	0.61	0	0.22	0	0	0.04	0.08	0.12	0
12/13/2001	2	1.03	0.02	0.06	0.53	0	0.23	0	0	0.05	0.1	0.11	0
12/13/2001	3	0.64	0.01	0.03	0.38	0	0.13	0	0	0.14	0.05	0.07	0
12/13/2001	4	1.1	0.02	0.05	0.57	0	0.21	0	0	0.08	0.14	0.12	0
12/13/2001	5	0.99	0.02	0.08	0.62	0	0.2	0	0	0.07	0.13	0.12	0
12/17/2001	1	1.25	0.04	0.03	0.64	0	0.22	0	0	0.11	0.15	0.15	0
12/17/2001	2	1.3	0.01	0.04	0.64	0	0.21	0	0	0.14	0.17	0.13	0
12/17/2001	3	1.07	0.02	0.08	0.57	0	0.21	0	0	0.1	0.15	0.16	0
12/17/2001	4	1.17	0.03	0.04	0.72	0	0.21	0	0	0.47	0.18	0.13	0
12/17/2001	5	1.03	0.01	0.05	1.05	0	0.2	0	0	0.06	0.1	0.13	0
12/18/2001	1	1.12	0.03	0.04	0.6	0	0.22	0	0	0.09	0.06	0.13	0
12/18/2001	2	1.11	0.01	0.07	0.58	0	0.22	0	0	0.19	0.15	0.12	0
12/18/2001	3	1.11	0.07	0.07	0.64	0	0.22	0	0	0.13	0.19	0.13	0
12/18/2001	4	1.04	0	0.09	0.6	0	0.21	0	0	0.08	0.13	0.12	0
12/18/2001	5	1.02	0.02	0.07	0.95	0	0.2	0	0	0.07	0.24	0.13	0
12/19/2001	1	0.98	0.02	0.06	0.54	0	0.2	0	0	0.06	0.1	0.12	0
12/19/2001	2	1.14	0.03	0.05	0.64	0	0.22	0	0	0.18	0.14	0.13	0
12/19/2001	3	1.35	0	0.09	0.61	0	0.23	0	0	0.18	0.18	0.15	0
12/19/2001	4	1.24	0.02	0.05	0.71	0	0.21	0	0	0.11	0.03	0.12	0
12/20/2001	1	1.21	0.01	0.04	0.69	0	0.21	0	0	0.09	0.12	0.12	0
12/20/2001	2	1.16	0.03	0.06	0.65	0	0.21	0	0	0.13	0.15	0.17	0
12/20/2001	3	1.09	0.01	0.06	0.68	0	0.22	0	0	0.15	0.14	0.12	0
12/20/2001	4	1.09	0.05	0.05	0.67	0	0.21	0	0	0.07	0.14	0.15	0
12/20/2001	5	1.06	0.03	0.04	1.61	0	0.2	0	0	0.05	0.03	0.15	0
12/21/2001	3	0.97	0.03	0.05	0.57	0	0.22	0	0	0.07	0.06	0.11	0
1/16/2002	1	0.82	0	0.04	0.46	0	0.16	0	0	0.03	0.05	0.08	0
1/16/2002	2	0.86	0.01	0.03	0.55	0	0.17	0	0	0.12	0.03	0.09	0
1/16/2002	3	0.83	0.01	0.03	0.46	0	0.19	0	0	0.05	0.01	0.08	0
1/16/2002	4	0.83	0.03	0.07	0.46	0	0.17	0	0	0.09	0.04	0.08	0
1/16/2002	5	0.75	0.01	0.04	1.38	0	0.15	0	0	0.03	0.07	0.1	0
1/17/2002	1	0.87	0.01	0.03	0.48	0	0.17	0	0	0.05	0.06	0.09	0
1/17/2002	2	0.78	0	0.04	0.44	0	0.16	0	0	0.1	0.08	0.08	0
1/17/2002	3	0.83	0.03	0.05	0.46	0	0.18	0	0	0.07	0.05	0.09	0
1/17/2002	4	0.86	0.06	0.03	0.47	0	0.17	0	0	0.08	0.07	0.09	0
1/17/2002	5	0.8	0.01	0.05	1.16	0	0.16	0	0	0.03	0.08	0.09	0

APPENDIX G, CONTINUED
VALID HALOCARBON VOC MEASURED BY ECD, ppb

			trans-1,3-	cis-1,3-	1,1,2-					1,1,2,2-			
Date	Site	trichloroethylene	dichloropropene	dichloropropene	trichloroethane	chlorodibromomethane	1,2-dibromoethane	perchloroethylene	chlorobenzene	tetrachloroethane	m-dichlorobenzene	p-dichlorobenzene	o-dichlorobenzene
12/6/2001	1	0	0	0	0	0	0	0.41	0	0	0.01	0.12	0.01
12/6/2001	2	0	0	0.01	0.01	0	0	0.25	0	0	0	0.2	0
12/6/2001	3	0	0	0	0	0	0	0.18	0	0	0	0.09	0
12/6/2001	4	0	0	0	0	0	0	0.26	0	0	0.01	0.13	0.01
12/7/2001	1	0	0	0	0	0	0	0.24	0	0	0.01	0.11	0
12/7/2001	2	0	0	0.02	0	0	0	0.21	0	0	0	0.18	0.02
12/7/2001	3	0	0	0	0.01	0	0	0.19	0	0	0.01	0.17	0
12/7/2001	4	0	0	0	0	0	0	0.06	0	0	0	0.02	0
12/7/2001	5	0	0	0.03	0.01	0	0	0.19	0	0	0.01	0.04	0
12/10/2001	1	0	0	0.01	0	0	0	0.11	0	0	0	0.05	0
12/10/2001	2	0	0	0	0	0	0	0.18	0	0	0	0.07	0
12/10/2001	3	0	0	0	0	0	0	0.07	0	0	0	0.04	0
12/10/2001	4	0	0	0.01	0	0	0	0.03	0	0	0.01	0.02	0
12/10/2001	5	0	0	0.02	0	0	0	0.04	0	0	0	0.01	0
12/11/2001	1	0	0	0	0.01	0	0	0.19	0	0	0.01	0.03	0
12/11/2001	2	0	0	0	0	0	0	0.13	0	0	0	0.02	0
12/11/2001	3	0	0	0.01	0	0	0	0.12	0	0	0	0.09	0
12/11/2001	4	0	0	0	0	0	0	0.13	0	0	0	0.02	0
12/11/2001	5	0	0	0.02	0	0	0	0.09	0	0	0	0.02	0
12/12/2001	1	0	0	0	0	0	0	0.11	0	0	0.01	0.07	0
12/12/2001	2	0	0	0	0	0	0	0.15	0	0	0	0.03	0
12/12/2001	3	0	0	0	0.01	0	0	0.1	0	0	0	0.06	0
12/12/2001	4	0	0	0.01	0	0	0	0.11	0	0	0	0.02	0
12/13/2001	1	0	0	0.01	0.01	0	0	0.12	0	0	0.01	0.04	0
12/13/2001	2	0	0	0	0	0	0	0.26	0	0	0	0.05	0
12/13/2001	3	0	0	0.01	0.01	0	0	0.1	0	0	0	0.07	0
12/13/2001	4	0	0	0	0.01	0	0	0.27	0	0	0	0.11	0
12/13/2001	5	0	0	0	0	0	0	0.22	0	0	0.01	0.05	0
12/17/2001	1	0	0	0	0	0	0	0.98	0	0	0.01	0.12	0
12/17/2001	2	0	0	0.01	0	0	0	0.75	0	0	0	0.21	0.01
12/17/2001	3	0	0	0	0	0	0	0.43	0	0	0	0.13	0
12/17/2001	4	0	0	0	0	0	0	0.86	0	0	0.01	0.07	0.01
12/17/2001	5	0	0	0	0	0	0	0.15	0	0	0.01	0.04	0
12/18/2001	1	0	0	0	0	0	0	0.65	0	0	0.01	0.11	0
12/18/2001	2	0	0	0	0	0	0	0.57	0	0	0.01	0.08	0.01
12/18/2001	3	0	0	0	0	0	0	0.49	0	0	0.01	0.12	0
12/18/2001	4	0	0	0	0	0	0	0.26	0	0	0.01	0.03	0
12/18/2001	5	0	0	0	0	0	0	0.3	0	0	0.01	0.05	0
12/19/2001	1	0	0	0	0.01	0	0	0.39	0	0	0.01	0.05	0
12/19/2001	2	0	0	0	0	0	0	0.36	0	0	0.01	0.15	0
12/19/2001	3	0	0	0	0	0	0	0.66	0	0	0.01	0.13	0
12/19/2001	4	0	0	0	0	0	0	0.51	0	0	0.01	0.12	0
12/20/2001	1	0	0	0	0	0	0	0.42	0	0	0.01	0.08	0
12/20/2001	2	0	0	0	0	0	0	0.47	0	0	0	0.11	0
12/20/2001	3	0	0	0	0	0	0	0.3	0	0	0.01	0.13	0
12/20/2001	4	0	0	0	0	0	0	0.23	0	0	0.01	0.08	0
12/20/2001	5	0	0	0.02	0	0	0	0.11	0	0	0	0.05	0
12/21/2001	3	0	0	0	0	0	0	0.12	0	0	0	0.13	0
1/16/2002	1	0	0	0	0	0	0	0.06	0	0	0	0.03	0
1/16/2002	2	0	0	0	0.02	0	0	0.09	0	0	0	0.11	0.01
1/16/2002	3	0	0	0	0	0	0	0.06	0	0	0	0.05	0
1/16/2002	4	0	0	0	0	0	0	0.06	0	0	0	0.02	0
1/16/2002	5	0	0	0	0.01	0	0	0.04	0	0	0	0.01	0
1/17/2002	1	0	0	0	0.01	0	0	0.2	0	0	0	0.05	0
1/17/2002	2	0	0	0	0	0	0	0.06	0	0	0	0.06	0
1/17/2002	3	0	0	0	0	0	0	0.22	0	0	0	0.06	0
1/17/2002	4	0	0	0.01	0.01	0	0	0.18	0	0	0	0.03	0
1/17/2002	5	0	0	0	0.01	0	0	0.07	0	0	0	0.02	0

APPENDIX H
VALID DATA FOR CARBONYL COMPOUNDS, BLANK CORRECTED ppb

Date	Site	HCHO	CH3CHO	Acetone	Acrolein	Propanal	Crotonaldehyde	MEK	Methacrolein	Butanal	Benzaldehyde	Pentanones	Pentanal	m-Tolualdehyde	Hexanal	Comment
12/06/01	1	0.35	1.73	3.64	<.02	0.24	0.07	0.47	<0.02	0.11	0.07	0.04	0.02	0.06	0.10	
12/06/01	1	0.36	1.80	3.74	<.02	0.23	0.07	0.53	<0.02	0.08	0.07	<0.02	0.02	0.08	0.12	Replicate
12/06/01	2	0.36	1.90	4.02	<.02	0.23	0.09	0.37	<0.02	0.16	0.09	<0.02	0.03	0.06	0.13	
12/06/01	3	0.38	1.84	4.08	<.02	0.25	0.11	0.62	<0.02	0.09	0.09	0.03	0.07	0.09	0.18	
12/06/01	4	0.31	1.45	2.93	<.02	0.20	0.10	0.46	<0.02	0.14	0.10	<0.02	0.03	0.09	0.06	
12/06/01	5	0.10	1.23	2.11	<.02	0.19	0.07	0.18	<0.02	0.10	0.07	<0.02	0.03	<0.02	0.05	
12/07/01	1	0.28	1.31	4.06	<.02	0.18	0.07	0.96	<0.02	0.07	0.07	0.03	0.04	0.13	0.13	
12/07/01	2	0.44	2.48	3.74	<.02	0.34	<0.02	1.80	<0.02	0.17	0.08	0.03	0.05	0.10	0.16	
12/07/01	3	0.37	1.77	4.92	<.02	0.30	<0.02	8.78	<0.02	0.12	0.07	0.04	0.06	0.23	0.28	
12/07/01	4	0.10	0.26	0.67	<.02	0.05	0.05	0.11	<0.02	0.01	0.07	<0.02	<0.02	<0.02	0.01	
12/07/01	5	0.13	1.05	1.48	<.02	0.16	0.07	0.13	<0.02	0.09	0.04	0.03	<0.02	0.03	0.05	
12/10/01	1	0.15	0.62	1.34	<.02	0.09	0.05	0.24	<0.02	0.03	0.03	<0.02	<0.02	0.05	0.05	
12/10/01	1	0.15	0.62	1.36	<.02	0.09	0.05	0.29	<0.02	0.03	0.03	<0.02	<0.02	0.05	0.06	Replicate
12/10/01	2	0.11	0.70	2.34	<.02	0.13	0.07	0.17	<0.02	0.06	0.02	0.08	<0.02	0.09	0.08	
12/10/01	3	0.16	0.69	1.39	<.02	0.10	0.06	0.20	<0.02	0.07	0.03	<0.02	0.02	0.04	0.13	
12/10/01	4	0.08	0.31	0.61	<.02	0.05	0.02	0.17	<0.02	0.05	0.02	<0.02	<0.02	<0.02	0.04	
12/10/01	5	0.02	0.11	0.32	<.02	0.04	<0.02	0.02	<0.02	0.00	0.00	<0.02	<0.02	<0.02	0.01	
12/11/01	1	0.29	1.40	2.91	<.02	0.16	0.08	0.41	<0.02	0.10	0.06	<0.02	<0.02	0.06	0.08	
12/11/01	2	0.31	1.36	3.04	<.02	0.19	0.07	0.43	<0.02	0.09	0.06	<0.02	0.07	0.06	0.20	
12/11/01	3	0.31	1.65	3.29	<.02	0.20	0.07	0.39	<0.02	0.12	0.06	<0.02	0.02	0.05	0.12	
12/11/01	4	0.33	1.27	2.62	<.02	0.19	0.08	0.73	<0.02	0.11	0.06	<0.02	0.02	0.07	0.06	
12/11/01	5	0.10	0.56	1.02	<.02	0.08	<0.02	0.08	<0.02	0.03	0.02	0.03	<0.02	<0.02	0.04	
12/12/01	5	0.26	1.11	2.37	<.02	0.18	0.06	0.45	<0.02	0.10	0.05	0.02	0.03	0.06	0.08	
12/12/01	1	0.27	1.16	2.42	<.02	0.19	0.06	0.47	<0.02	0.08	0.06	<0.02	0.02	0.05	0.07	
12/12/01	2	0.34	1.51	3.75	<.02	0.24	0.05	0.47	<0.02	0.08	0.07	0.07	0.05	0.09	0.18	
12/12/01	3	0.40	2.11	3.79	<.02	0.27	0.09	0.60	<0.02	0.15	0.09	0.06	0.08	0.09	0.15	
12/12/01	4	0.34	1.41	2.70	<.02	0.22	0.07	0.47	<0.02	0.08	0.12	0.04	0.05	0.09	0.09	
12/12/01	5	0.26	1.48	2.52	<.02	0.28	0.08	0.29	<0.02	0.11	0.07	0.02	<0.02	0.08	0.09	
12/13/01	1	0.40	1.78	3.68	<.02	0.28	<0.02	0.69	<0.02	0.16	0.10	<0.02	0.03	0.08	0.08	
12/13/01	2	0.37	1.85	2.96	<.02	0.25	0.07	0.37	<0.02	0.11	0.06	<0.02	<0.02	0.07	0.10	
12/13/01	3	0.46	2.07	4.36	<.02	0.33	0.11	0.76	<0.02	0.19	0.14	0.04	0.06	0.10	0.24	
12/13/01	4	0.46	1.95	3.79	<.02	0.30	0.06	0.77	<0.02	0.11	0.11	<0.02	0.04	0.10	0.08	
12/13/01	5	0.20	1.27	1.85	<.02	0.22	0.09	0.20	<0.02	0.10	0.05	0.03	<0.02	0.03	0.06	
12/17/01	1	0.37	2.12	4.06	<.02	0.26	0.12	1.35	<0.02	0.13	0.08	0.05	0.06	0.23	0.22	
12/17/01	1	0.35	2.05	3.92	<.02	0.27	0.11	1.34	<0.02	0.14	0.09	0.05	0.05	0.21	0.22	Replicate
12/17/01	2	0.37	2.50	3.36	<.02	0.27	0.07	0.37	<0.02	0.12	0.06	0.05	0.03	0.08	0.14	
12/17/01	3	0.48	2.12	3.47	<.02	0.28	0.07	0.50	<0.02	0.11	0.06	<0.02	0.07	0.10	0.27	
12/17/01	4	0.33	1.61	2.62	<.02	0.23	0.07	0.34	<0.02	0.09	0.06	<0.02	0.03	0.07	0.08	
12/17/01	5	0.12	1.04	1.07	<.02	0.15	0.03	0.12	<0.02	0.08	0.02	0.04	<0.02	0.02	0.06	
12/18/01	1	0.41	2.11	3.11	<.02	0.31	0.07	0.52	<0.02	0.16	0.09	0.02	0.03	0.10	0.11	
12/18/01	2	0.39	2.42	4.11	<.02	0.33	<0.02	0.46	<0.02	0.18	0.09	0.05	0.04	0.07	0.14	
12/18/01	3	0.25	1.30	1.89	<.02	0.18	0.06	0.27	<0.02	0.08	0.06	<0.02	0.03	0.04	0.14	
12/18/01	4	0.45	2.24	2.73	<.02	0.32	0.06	0.60	<0.02	0.18	0.09	<0.02	0.04	0.09	0.11	
12/18/01	5	0.13	1.18	1.58	<.02	0.19	0.03	0.20	<0.02	0.08	0.05	0.03	<0.02	0.03	0.05	
12/19/01	1	0.43	2.52	4.20	<.02	0.35	0.12	0.70	<0.02	0.25	0.08	0.02	0.04	0.12	0.13	
12/19/01	1	0.44	2.59	4.28	<.02	0.36	0.10	0.85	<0.02	0.28	0.08	0.03	0.03	0.12	0.12	Replicate
12/19/01	2	0.47	2.99	5.14	<.02	0.43	0.08	0.74	<0.02	0.25	0.09	0.06	0.05	0.12	0.16	
12/19/01	3	0.64	3.50	5.13	<.02	0.49	0.21	1.23	<0.02	0.27	0.12	0.03	0.08	0.19	0.40	
12/19/01	4	0.53	3.10	3.76	<.02	0.46	0.11	1.13	<0.02	0.40	0.17	<0.02	0.05	0.20	0.17	
12/19/01	5	0.23	1.69	2.20	<.02	0.26	0.07	0.27	<0.02	0.11	0.06	0.03	<0.02	0.02	0.06	
12/20/01	1	0.23	1.13	1.47	<.02	0.15	0.08	0.23	<0.02	0.09	0.04	<0.02	<0.02	0.03	0.06	
12/20/01	2	0.25	1.34	1.68	<.02	0.20	0.08	0.47	<0.02	0.21	0.04	0.03	0.03	<0.02	0.07	
12/20/01	3	0.32	1.47	3.04	<.02	0.21	0.07	0.44	<0.02	0.12	0.07	<0.02	0.05	0.08	0.25	
12/20/01	4	0.26	1.40	2.61	<.02	0.22	0.16	0.61	<0.02	0.23	0.07	<0.02	0.03	<0.02	0.12	
12/20/01	5	0.15	1.00	1.59	<.02	0.14	0.09	0.14	<0.02	0.12	0.04	0.03	<0.02	0.04	0.06	
01/16/02	1	0.17	0.72	1.67	<.02	0.08	0.08	0.30	<0.02	0.03	0.02	<0.02	<0.02	0.08	0.07	
01/16/02	1	0.15	0.63	1.46	<.02	0.09	0.10	0.31	<0.02	0.02	0.02	<0.02	<0.02	0.08	0.05	Replicate
01/16/02	1	0.18	0.77	1.75	<.02	0.10	<0.02	0.30	<0.02	0.05	0.05	<0.02	<0.02	0.07	0.03	
01/16/02	1	0.17	0.74	1.65	<.02	0.11	0.10	0.30	<0.02	0.03	0.03	<0.02	<0.02	0.09	0.05	Rep/Dup
01/16/02	2	0.18	1.00	1.92	<.02	0.11	0.06	0.20	<0.02	0.07	0.02	<0.02	0.02	0.03	0.08	
01/16/02	2	0.18	1.06	1.92	<.02	0.15	0.06	0.21	<0.02	0.06	0.04	<0.02	0.03	0.03	0.08	Duplicate
01/16/02	3	0.21	0.99	1.86	<.02	0.15	0.10	0.34	<0.02	0.12	0.03	<0.02	0.07	0.08	0.18	
01/16/02	3	0.25	1.27	2.25	<.02	0.16	0.09	0.33	<0.02	0.12	0.06	<0.02	0.07	0.07	0.20	Duplicate
01/16/02	4	0.18	0.67	1.38	<.02	0.11	0.08	0.27	<0.02	0.11	0.04	<0.02	<0.02	0.04	0.05	
01/16/02	4	0.18	0.68	1.37	<.02	0.10	0.07	0.22	<0.02	0.05	0.04	<0.02	<0.02	0.04	0.05	Duplicate
01/16/02	5	0.07	0.37	0.87	<.02	0.07	0.05	0.10	<0.02	0.01	0.00	<0.02	<0.02	<0.02	0.03	
01/16/02	5	0.07	0.33	0.86	<.02	0.07	0.03	0.15	<0.02	0.02	0.00	<0.02	<0.02	<0.02	0.02	Duplicate
01/17/02	1	0.32	1.44	3.42	<.02	0.19	0.06	0.44	<0.02	0.08	0.05	<0.02	0.02	0.08	0.08	
01/17/02	2	0.27	1.24	3.08	<.02	0.19	0.10	0.31	<0.02	0.09	0.05	0.03	<0.02	0.06	0.06	
01/17/02	3	0.40	1.96	4.58	<.02	0.26	0.10	0.71	<0.02	0.17	0.09	0.05	0.07	0.10	0.44	
01/17/02	4	0.34	1.34	3.20	<.02	0.20	0.08	0.61	<0.02	0.07	0.05	<0.02	0.03	0.12	0.09	
01/17/02	5	0.11	0.51	1.09	<.02	0.07	0.08	0.14	<0.02	0.05	0.02	<0.02	<0.02	0.03	0.01	